

*Materials for a Flora of the Malayan Peninsula*, No. 26.—By  
A. T. GAGE.

This part contains the first instalment of Family No. 117, Euphorbiaceae, being an account of the species belonging to six genera, out of the total of 64 genera found to occur in the Malayan Peninsula.

Family CXVII. EUPHORBIACEAE.

Herbs, shrubs or trees, seldom climbers, often with a mild juice. *Leaves* usually alternate and simple, if compound nerves pinnately so; sometimes reduced to scales; glabrous or + — simple or stellately hairy or lepidote; stipules usually present and usually small, caducous or persistent, rarely connate as a bud sheath lamina and petiole junction sometimes glandular. *Flowers* 1-sexual monoecious or dioecious, usually small, often minute. *Inflorescence* usually mixed; sometimes, as in *Euphorbia*, of turbinate involucre resembling a gamosepalous perianth within which 1-stamened ♂ florets surround a solitary ♀ flower reduced to a stipitate pistil but usually axillary or racemose and centripetal, with the ultimate divisions cymose and centrifugal or, from reduction of the ultimate cymules to a single flower, centripetal throughout; sometimes spiriformly racemose or paniculate or sometimes of terminal dichotomous cymes or reduced to simple clusters or solitary flowers; bract subtending the cymes or flowers usually small and scalelike, sometimes enlarged and sometimes connate and involucre form; bracteoles often 2 within a bract or indefinite. *Perianth* seldom 0, when present often differing in the sexes; sometimes single and calycine with valvate or imbricate segments or with sepals in 2 series imbricate and similar or rarely with outer and inner series dissimilar, sometimes double, with petals small and scalelike or rarely with petals larger than the sepals and contorted imbricate. *Male flowers* without a disk or with an intrastaminal disk or extrastaminal disk or with glands or lobes alternating with stamens of outer series. *Stamens* various; solitary or fewer than or as many as the separate or indefinite and sometimes very numerous; filaments free to variously united; anthers variously affixed, usually 2-celled, rarely 3-4-locellate; the loculi usually parallel or didymous with longi-

tudinal dehiscence, sometimes variously divaricate, sometimes + — cruciformly arranged, rarely confluent at the apex and rarely with porous or transverse dehiscence. *Pistillode* present or 0. *Female flowers* without a disk or the disk present and hypogynous and annular or pulvinate or lining the lower part of calyx; staminodes seldom present. *Ovary* usually sessile, 1-many-locular but often 3-locular, the loculi 1-2-ovuled; the ovules pendulous from the inner angle, with ventral raphe, anatropous, often with the funicle expanded into a cellular or scalelike or hoodlike mass; styles present or stigmas sessile; styles as many as the carpels, free or + — united and entire or + — divided, erect or spreading or recurved, subulate or variously thickened or dilated, with stigmatic surface on inner face; sessile stigmas + — lobed or disciform. *Fruit* usually a capsule of as many cocci as ovarian loculi, usually 3, the cocci breaking away into 2 valves from a persistent centre axis; sometimes a drupe with 1-3 cells, seldom of 2-3 pyrenes. *Seeds* as many as the ovules or fewer, attached at or from above the middle to near the apex of the cell, with or without an arillus or caruncle at the apex; albumen usually abundant and fleshy; embryo usually straight, enclosed in the albumen and with large complanate cotyledons, rarely minute with narrow semiterete cotyledons; rarely albumen 0 or very scanty and cotyledons fleshy. **DISTRIB.** Genera about 200 with about 4,000 species mostly confined to the tropics.

Since No. 25 of these "Materials" was published in 1915, the great increase in cost of paper and printing has made condensation—consistent with clearness,—of statement a virtue of necessity. Accordingly the original MSS. of that account of the *Euphorbiaceae*—a great part of which was written before the war—has been entirely rewritten and reduced. The reduction may be far from apparent, as owing to so many of the species—all of which are unisexual to begin with—having dioecious flowers and different inflorescences in the two sexes only a relative, not an absolute shortening of specific descriptions has been possible. The generic definitions have been restricted to descriptions of the characters common only to the Malayan Peninsula species under each genus, but these characters—including the vegetative ones—have been described in considerable detail to avoid repetition of them in successive specific descriptions.

The citations of authors have been ruthlessly pruned, only those being given that I think are likely to be of practical use to students of Malayan Euphorbiaceae.

The most important works are:—

E. BOISSIER. *Euphorbia* in D.C. Prodr. XV, ii, 7-187 (published 1862).

- J. MULLER. Euphorbiaceæ in D.C. Prodr. XV, ii, 189-1273, (published 1862-66).  
 J. D. HOOKER. Euphorbiaceae in Fl. Brit. Ind. V, 239-477, (published 1887).  
 J. J. SMITH. Euphorbiaceae in Koorders and Valeton Boomsorten of Java, Bijl. No. 12, 9-637, (published in 1910).

To economise space in referring to those four works, only the author's name and page number are given, the name of the work and the year of publication being understood. As these four works should be at the disposal of any systematic student of Malayan Euphorbiaceae, no citations—apart from the more important synonyms—appearing in any of them and accepted by me as correct, are repeated in this account. Only such of the more important synonyms as I have verified or have reason to believe are correct are given. Citations of works other than the four mentioned above are given in full.

The most important collections from the Malayan Peninsula have been made by Curtis, Kunstler, Ridley, Scortechini and Wray. On the specimen tickets Kunstler's own name seldom appears, his identity being hidden usually as "Dr. King's Collector." To save space in the quotation of sheets, the letters *C.*, *KC.*, *R.*, *S.* and *W.* are used to denote respectively *Curtis*, *Kunstler* or *King's Collector*, *Ridley*, *Scortechini* and *Wray*. The surnames of other collectors are given in full. The numbers quoted for sheets collected by Griffith and Maingay are the numbers under which those sheets were distributed from Kew Herbarium.

In the descriptions the colours mentioned are the colours in the dried state unless otherwise mentioned. Under "leaves" the word "nerves" without any qualifying adjective means lateral nerves; the numbers of nerves mentioned in any description of leaves are the numbers counted on one side of the midrib on the lower surface of the leaf. The word "nervules" without any qualifying adjective means the secondary nerves connecting the primary lateral ones. "Reticulation" means the network formed by the ultimate veinlets filling the internervular spaces. The signs "+ -" signify "more or less."

The seeds of very many species, especially of those with 1-seeded capillary loculi, have a + - convex dorsal and 2 ventro-lateral surfaces, the latter varying from almost plane to convex in various degrees and separated by a mesial longitudinal ridge which may be of various degrees of acuteness or obtuseness. Such seeds have a general resemblance to a headless beetle, except of course that in beetles there is usually no distinct mesial ventral ridge. The term "scarabaeoid" is used to indicate briefly the form of such seeds in the generic and specific descriptions.

#### SYNOPSIS OF TRIBES, SUBTRIBES AND GENERA.

The separation by exclusive characters of the various tribes and subtribes to which Euphorbiaceae have been divided by different botanists is by no means easy, as a study of the tribal and subtribal characters given in *Genera Plantarum*, in the *Flora of British India* and in the *Pflanzenfamilien* proves. The divisions here adopted follow in the main Pax's arrangement in the *Pflanzenfamilien* (Teil, III Abt. 5) with diagnostic and other modifica-

tions. *Endospermum* placed by Pax under *Gelonieae* is, on account of its valvate calyx and 4-locellate anthers, transferred to *Acalypheae*. So *Erismanthus* also placed by Pax under *Gelonieae*, although it is petaliferous, is transferred to *Cluytiaceae*.

### A. Cells of Ovary 2-ovuled.—Phyllanthoideae.

- a. Embryo large .. .. Tribe I, PHYLLANTHEAE.
- b. Leaves simple.
- c. Flowers petaliferous.
- d. Calyx lobes valvate in bud; staminal filaments united; ♀ disk with a coronal annulus .. .. Subtribe I, Bridelinae.
- Ovary 2-celled .. .. 1. BRIDELIA.
- Ovary 3-celled .. .. 2. CLEISTANTHUS.
- d'. Calyx lobes imbricate in bud; filaments free; ♀ disk without a coronal annulus .. .. Subtribe II, Andrachninae.
- Disk annular or cupuliform; albumen scanty 3. ACTEPHILA.
- Disk of separate glands; albumen copious .. 4. ANDRACHNE.
- c'. Flowers apetalous.
- d. Leaves alternate.
- e. ♂ flowers in axillary fascicles or solitary.
- f. ♂ disk 0 or annular or of separate glands; stigmas not dilated or only so at tip .. .. Subtribe III, Phyllanthinae.
- g. Disk or glands in the ♂ and usually also in ♀.
- h. Disk or glands 0 in ♀ .. .. 5. AGYNEIA.
- h'. Disk or glands in ♀.
- j. Flowers dioecious .. .. 6. FLUEGGEA.
- j'. Flowers monoecious.
- Disk in ♂ and ♀ of fleshy minute scales or (but rarely in ♀) a membranous crenulate or lobed ring or shallow cup .. .. 7. PHYLLANTHUS.
- Disk in ♂ and ♀ of linear or ligulate petaloid lobes .. .. 8. PHYLLANTHODENDRON.
- g'. Disk or glands 0 in ♂ and ♀.
- Sepals ♂ and ♀ spreading or ♀ calyx tubular and dentate .. .. 9. GLOCHIDION.
- ♂ calyx turbinate or obpyriform, with thickened crenulately inflected lobulate margin.. .. 10. BREYNIA.
- ♂ calyx compressed from above downwards and disciform, with a minute central opening .. .. 11. SAUROPUS.
- f'. ♂ disk a central flat or concave plate; stigmas broadly dilated .. Subtribe IV, Drypetinae.
12. DRYPETES.



- e'. ♂ flowers in axillary spikes or racemes or panicles .. .. Subtribe V, Antidesminae.
- f. ♂ disk very distinct, fleshy circular, pulvinate or subconical .. .. 13. ANTIDESMA.
- f'. ♂ disk 0 or of very minute glands.
- g. ♂ flowers in axillary or subterminal panicles .. .. 14. SOORTECHINIA.
- g'. ♂ flowers in very short catkinlike spikes.  
♂ catkins and lower surface of leaves gland dotted; fruit of laterally flattened cocci .. .. 15. HYMENOCARDIA.  
♂ catkins and lower surface of leaves eglandular; fruit ovoid or globose .. 16. APOROSA.
- g". ♂ flowers in moderately to very long, + — pendent racemes or racemiform panicles .. .. 17. BACCAUREA.
- d'. Leaves opposite .. .. Subtribe VI, Toxicodendrinae.  
18. CHORIOPHYLLUM.
- b', Leaves compound .. .. Subtribe VII, Bischofiaenae.  
19. BISCHOFIA.
- a'. Embryo minute .. .. Tribes II, DAPHNIPHYLLEAE.  
20. DAPHNIPHYLLUM.

# **B. Cells of Ovary 1-ovuled.—Crotonoideae.**

- a. ♂ and ♀ flowers with single or double perianth and not clustered together in calyxlike involucres.
- b. Inflorescence of terminal 2-3-chotomous cymes .. .. Tribe III, JATROPHEAE.
- c. ♂ and ♀ flowers apetalous .. .. 21. ELATERIOSPERMUM.
- c'. ♂ flowers petaliferous.  
Stamens free .. .. 22. ALEURITES.  
Inner or all stamens connate .. .. 23. JATROPHA.
- b'. Inflorescence axillary or if terminal not of 2-3-chotomous cymes.
- c. ♂ flowers petaliferous.
- d. Outer or all stamens opposite the sepals .. .. Tribe IV, GALEARIEAE.  
Inflorescence of very long slender arched single terminal spiciform racemes .. .. 24. GALEARIA.  
Inflorescence of axillary or lateral fascicles or cymes or panicles .. .. 25. MICRODESMIS.
- d'. Outer or all stamens alternate with the sepals.
- e. Stamens strongly inflected in the bud .. .. Tribe V, CROTONEAE.  
26. CROTON.

*e'*. Stamens erect in the bud **Tribe VI, CLUYTIEAE.**

*f*. Inner or all staminal filaments united.

*g*. Pistillode present .. .. 27. **TRIGONOPLEURA.**

*g'*. Pistillode 0.

Stamens 3-5 .. .. 28. **TRIGONOSTEMON.**

Stamens 10-20 .. .. 29. **DIMORPHOCALYX.**

*f'*. Staminal filaments all free.

*g*. Anther cells pendulous from the apex .. 30. **AGROSTISTACHYS.**

*g'*. Anther cells connate.

♂ flowers on hairlike pedicels from axillary conicules of minute imbricate bracts; pistillode present; ♀ sepals foliaceous .. .. 31. **ERISMANTHUS.**

♂ flowers not on hairlike pedicels from axillary conicules; pistillode 0; ♀ sepals not foliaceous .. .. 32. **OSTODES.**

*c'*. ♂ flowers apetalous.

*d*. Twining shrubs.. **Tribe VII, PLUKENETIEAE.**

*e*. ♂ calyx 3-lobed; stamens 3.

Flowers in androgynous racemes; disk 0;

♀ calyx of 3 sepals .. .. 33. **CNESMONE.**

Flowers in 1-sexual racemes; disk lining ♂

calyx; ♀ calyx of 5 sepals .. .. 34. **MEGISTOSTIGMA.**

*e'*. ♂ calyx 4-6-lobed; stamens 8-30.

Leaves simple, not lobed; involucre 0; ♀

sepals not lacerate or pinnatifid .. .. 35. **PLUKENETIA.**

Leaves 3-foliolate or lobed; flower heads

with large involucre; ♀ sepals lacerate or

pinnatifid .. .. 36. **DALECHAMPIA.**

*d'*. Erect shrubs or trees, rarely erect herbs.

*e*. ♂ calyx valvate in bud .. **Tribe VIII, ACALYPHEAE.**

*f*. Stamens free or united only at the base and unbranched.

*g*. Anther cells 2.

*h*. Cells diverging upwards from the base .. .. **Subtribe I, Acalyphinae.**

*j*. Cells not flexuous or vermiform.

Flowers regularly distributed along

rachis; cocci dehiscing loculicidally.. 37. **CLAOXYLON.**

Flowers in distant clusters on a fili-

form rachis; cocci dehiscing loculici-

dally and septicidally .. .. 38. **MICROCOCCA.**

*j'*. Cells flexuous or vermiform .. .. 39. **ACALYPHA.**

*h'*. Cells not diverging from the

base .. .. **Subtribe II, Mercurialinae.**

*j*. Cells pendulous, diverging from the

apex .. .. 40. **COELODEPAS.**

- j.* Cells parallel or didymous, connate, or adnate to a broad connective.
- k.* Stamens 4-10; central disk or convexity 0  
     Pistillode 0 .. .. 41. *ALCHORNEA*.  
     Pistillode stout .. .. 42. *EPIPRINUS*.
- k'.* Stamens 20 to very many; central disk or convexity conspicuous.
- l.* Stamens surrounding a flat or slightly concave disk .. .. 43. *COELODISCUS*.
- l'.* Filaments imbedded between the lobules of a large convex central glandular mass.  
     Filaments exserted, filiform; anthers of usual shape .. .. 44. *BLUMEODENDRON*.  
     Filaments very short, peltately bearing orbicular imbricating connectives, on inner surface of which are the cells .. .. 45. *BOTRYOPHORA*.
- l''.* Stamens arising from a central, convex, non-lobulate, eglandular receptacle.
- m.* Flowers 1-1.5 cm. in diam., appearing before the leaves; fruit a drupe .. .. 46. *TREWIA*.
- m'.* Flowers much less than 1 cm. in diam., not appearing before the leaves; fruit capsular.
- n.* Flower clusters with about thrice as many bracts as flowers; bracts glumaceous .. .. 47. *KUNSTLERIA*.
- n'.* Flower clusters with not more bracts than flowers and usually fewer; bracts not glumaceous.  
     Ovule and seed ecarunculate .. 48. *MALLOTUS*.  
     Ovule and seed carunculate .. 49. *COCCOCERAS*.
- g'.* Anthers with 3-4 locelli.
- h.* Anthers with a prominent broad shield-like connective bearing pairs of superposed unequal locelli; fruit indehiscent 50. *PTYCHOPHYXIS*.
- h'.* Connective not broad; locelli equal and + - cruciformly arranged on face or apex of connective.
- j.* Stamens 50-60, distinctly verticillate; connective shortly produced; styles + - elongate and divided .. .. 51. *CLEIDION*.
- j'.* Stamens not more than 30, usually much fewer, not distinctly verticillate;

connective not produced; styles short  
and simple or stigmas sessile.

Stamens not arising from a distinct  
clavate receptacle .. .. 52. MACARANGA.

Stamens arising from a distinct cla-  
vate receptacle .. .. 53. ENDOSPERMUM.

*f*. Staminal filaments repeatedly  
branched .. .. Subtribe III, Ricininae.

Flowers monoecious; ♀ calyx spathi-  
form; leaves palmately lobed .. .. 54. RICINUS.

Flowers dioecious; ♀ calyx not spathi-  
form; leaves not palmate .. .. 55. HOMONOIA.

*e*. ♂ calyx imbricate in bud  
or obsolete.

*f*. Inflorescence of axillary  
or leaf-opposed clusters,  
seldom of axillary racemi-  
form panicles; disk or  
glands in both sexes or at  
least in the ♀ .. .. Tribe IX, GELONIEAE.

*g*. Staminal filaments united with base of  
conspicuous pistillode .. .. 56. CHAETOCARPUS.

*g*'. Stamens free; pistillode 0 or very small  
Flowers dioecious; clusters leaf-opposed .. 57. GELONIUM.

Flowers monoecious; clusters or pan-  
icles axillary .. .. 58. BALIOSPERMUM.

*f*'. Flowers in 1-sexual or 2-  
sexual usually glanduli-  
ferous axillary or terminal  
spikes, racemes or pan-  
icles; disk 0 .. .. Tribe X, HIPPOMANEAE.

*g*. Erect shrubs or trees.

*h*. ♂ calyx laterally compressed, of 2  
sepals.

Racemes axillary; stamens 12-15 .. 59. PIMELEODENDRON.

Racemes terminal; stamens 6 or fewer .. 60. HOMALANTHUS.

*h*'. ♂ calyx not compressed, usually 3-  
lobed.

Flowers dioecious; inflorescence lateral .. 61. EXCOECARIA.

Flowers monoecious; inflorescence ter-  
minal .. .. 62. SAPIUM.

*g*'. A herb .. .. 63. SEBASTIANIA.

*a*'. Flowers of both sexes clustered  
within calyx like involucre,  
each cluster consisting of several  
♂ flowers—reduced to stipitate  
stamens—surrounding a central  
solitary ♀ flower reduced to a  
stipitate 3-carpellary pistil; the



whole superficially resembling

a ♂ gamosepalous flower .. Tribe XI, EUPHORBIEAE.

64. EUPHORBIA.

Excluded genus.—LOPHOPYXIS.

# KEY TO THE GENERA.

For the case of a family like Euphorbiaceae the ideal would be to have three keys, one founded on male material, another on female material in flower and the third on material in fruit. Unfortunately the material so far available is not enough to allow of this ideal being attained. The present key is therefore of the nature of a makeshift and not a satisfactory one. Still it is hoped that in conjunction with the generic synopsis it may be of some use. *Trigonopleura*, *Botryophora* and *Kunstlera* are absent from the female section of the dioecious division, as the female plants of those genera are as yet unknown.

## A. Flowers Monoecious.

a. Cells of ovary 2-ovuled.

b. Flowers petaliferous ; petals usually minute.

c. Calyx lobes valvate ; staminal filaments united in a short central column ; ♀ disk with a coronal annulus.

Ovary 2-celled .. .. 1. BRIDELIA.

Ovary 3-celled .. .. 2. CLEISTANTHUS.

c'. Calyx lobes imbricate ; filaments free ; ♀ disk without a coronal annulus.

Flowers rather large ; disk a basal cup or ring ; albumen scanty .. .. 3. ACTEPHILA.

Flowers small ; disk of separate glands ; albumen copious .. .. 4. ANDRACHNE.

b'. Flowers apetalous.

c. Disk or glands in ♂ flowers and usually also in ♀.

d. Disk or glands 0 in ♀ flowers .. .. 5. AGYNEIA.

d'. Disk or glands present in ♀ flowers.

Disk in ♂ and ♀ of fleshy minute scales or (but rarely in ♂) a crenulate or lobed ring or shallow cup .. .. 7. PHYLLANTHUS.

Disk in ♂ and ♀ of linear or ligulate petaloid lobes .. .. 8. PHYLLANTHODENDRON.

e'. Disk or glands 0 in both sexes.

Sepals of both sexes spreading or ♀ calyx tubular and dentate .. .. 9. GLOCHIDION.

♂ calyx turbinate or obpyriform, with thickened and crenulately inflexed lobulate margin .. 10. BREYNIA.

♂ calyx compressed from above downwards and disciform with a minute central opening .. 11. SAUROPIUS.

f. Cells of ovary 1-ovuled.

Flowers ♂ and ♀ clustered within calyxlike involucre, each containing several to many ♂

flowers—reduced to stipitate stamens—surrounding a central solitary ♀ reduced to a stipitate 3-carpellary ovary; the whole superficially resembling a ♂ flower with a gamosepalous calyx .. 64. EUPHORBIA.

b'. Flowers of different sexes not clustered within calyxlike involucre but separate and with a single or double perianth.

c. ♂ flowers at least petaliferous, usually also the ♀; petals sometimes very minute in ♀.

d. Staminal filaments free.

e. ♂ flowers on hairlike pedicels from axillary conicles of minute imbricate bracts; pistillode capillary; ♀ sepals foliaceous .. 31. ERISMANTHUS.

e'. ♂ flowers not on hairlike pedicels from axillary conicles; pistillode 0; ♀ sepals not foliaceous.

f. Junction of lamina and petiole eglandular 32. OSTODES.

f'. Junction of lamina and petiole prominently 2-glandular.

Inflorescence of terminal 2-3-chotomous cymes; fruit a large drupe .. 22. ALEURITES.

Inflorescence of terminal androgynous spikes or racemes; fruit a capsule .. 26. CROTON.

d'. Inner or all staminal filaments connate to form a central column.

e. Leaves + — orbicular, often lobed; flowers in terminal dichotomous cymes; stamens numerous .. 23. JATROPHA.

e'. Leaves lanceolate, entire; flowers in axillary or terminal spikes or racemes or in axillary or lateral clusters; stamens 3-10.

Flowers and fruits in axillary or terminal spikes or racemes; pistillode 0 .. 28. TRIGONOSTEMON.

Flowers and fruits in axillary or lateral clusters; pistillode 3-cleft, surmounting staminal column .. 27. TRIGONOPLEURA.

c'. Both ♂ and ♀ flowers apetalous.

d. Twining plants.

e. ♂ calyx 3-lobed; stamens 3.

Plant densely villose; racemes androgynous; stamens alternisepalous; disk 0; ♀ calyx of 3 sepals; stigma not larger than ovary .. 33. CNESMONE.

Plant almost glabrous or only pubescent; racemes 1-sexual; stamens central; disk lining ♂ calyx; ♀ calyx of 5 sepals; stigma larger than ovary .. 34. MEGISTOSTIGMA.

e'. ♂ calyx 4-6-lobed; stamens 8-30.

Leaves simple, not lobed; racemes without  
conspicuous involucre bracts; ♀ sepals not  
lacerate or pinnatifid .. .. 35. *PLUKENETIA*.  
Leaves 3-foliolate or lobed; flower heads  
with conspicuous involucre bracts; ♀ se-  
pals lacerate or pinnatifid .. .. 36. *DALECHAMPIA*.

d'. Erect shrubs or trees.

e. Flowers in 2-3-chotomous cymes; staminodes  
in ♀ flowers .. .. 21. *ELATERIOSPERMUM*.

e'. Flowers in 1-or 2-sexual axillary or terminal  
spikes, racemes or panicles or ♀ flowers  
solitary; staminodes 0.

f. Stamens not exceeding 20, usually fewer.

g. Anther cells diverging upwards from the  
base.

h. Cells not flexuous or vermiform .. 38. *MICROCOCOA*.

h'. Cells flexuous or vermiform, very  
minute. .. .. 39. *ACALYPHA*.

g'. Cells not diverging from the base.

h. ♂ calyx compressed, of 2 sepals.

Racemes axillary, eglandular; sta-  
mens 12-15 .. .. 59. *PIMELEODENDRON*.

Racemes terminal, glandular; sta-  
mens 6-10 .. .. 60. *HOMALANTHUS*.

h'. ♂ calyx not compressed, usually 3-  
lobed.

i. Stamens 2-3.

Inflorescence lateral .. .. 61. *EXCOECARIA*.

Inflorescence terminal .. .. 62. *SAPIUM*.

i'. Stamens more than 4.

k. Glands in ♂ flowers .. .. 58. *BALIOSPERMUM*.

k'. Glands 0 in ♂ flowers.

l. Pistillode 0 .. .. 41. *ALCHORNEA*.

l'. Pistillode present.

Staminal fils. dilated; cells pendu-  
lous or divergent downwards; ♀  
sepals not alternating with thick  
scales .. .. 40. *COELODEPAS*.

Filaments not dilated; cells pa-  
rallel; ♀ sepals alternating with  
thick scales.. .. 42. *EPIPRINUS*.

f'. Stamens numerous.

g. Filaments branched; cells distant .. 54. *RICINUS*.

g'. Filaments not branched; cells not dis-  
tant.

h. Cells unequal, in superposed pairs on  
a broad produced connective .. 50. *PTYCHOPYXIS*.

- h'. Cells equal, not in superposed pairs.  
 Anthers 2-celled, cells parallel or  
 didymous, adnate to the connective.. 48 MALLOTUS.  
 Anthers of 4 minute locelli cruci-  
 formly arranged .. .. 51. CLEIDION.  
 d". A herb .. .. 63. SEBASTIANIA.

## B. Flowers Dioecious.

### I.—MALE PLANTS.

- a. Flowers petaliferous.  
 b. Disk or glands present.  
 c. All staminal filaments united into a distinct  
 column .. .. 27. TRIGONOPLEURA.  
 c'. All filaments free or only the inner connate.  
 d. Disk a 5-lobed ring .. .. 3. ACTEPHILA.  
 d'. Disk of separate glands.  
 e. Petals 5.  
 Flowers in lax terminal many-flowered cymose  
 panicles .. .. 22. ALEURITES.  
 Flowers in axillary or terminal few-flowered  
 racemes .. .. 29. DIMORPHOCALYX.  
 e'. Petals 8; flowers in axillary or lateral  
 glumaceously bracteate racemes or spikes .. 30. AGROSTISTACHYS.  
 b'. Disk or glands absent.  
 c. Flowers in long slender arched single terminal  
 spiciform racemes .. .. 24. GALEARIA.  
 c'. Flowers in axillary or lateral fascicles, cymes or  
 panicles.  
 Pistillode present .. .. 25. MICRODESMIS.  
 Pistillode 0 .. .. 32. OSTODES.  
 a. Flowers apetalous.  
 b. Disk or glands present.  
 c. Staminal filaments united with base of conspi-  
 cuous pistillode .. .. 56. CHAETOCARPUS.  
 c'. Filaments all free or only the inner connate.  
 d. Stamens fewer than 10.  
 e. Disk of separate glands.  
 Leaves less than 7 cm. long; stamens exserted 6. FLUEGGEA.  
 Leaves more than 10 cm. long; stamens  
 included .. .. 14. SCORTECHINIA.  
 e'. Disk circular, conical or pulvinate .. 13. ANTIDESMA.  
 d'. Stamens more than 10, often very many.  
 e. Disk a central disciform or quadrate plate  
 with the stamens surrounding it.  
 Leaves alternate, penninerved, without stel-  
 late pubescence; sepals 4-6, imbricate .. 12. DRYPETES.  
 Leaves opposite, in unequal pairs, basally



- 3-7-plinerved, with stellate pubescence; sepals  
 3, valvate .. .. 43. COELODISCUS.
- e'. Disk a central hemispherical polygonally  
 multilobulate mass, with filament bases be-  
 tween the lobules .. .. 44. BLUMEODENDRON.
- b'. Disk or glands absent.
- c. Leaves trifoliate .. .. 19. BISCHOFIA.
- c'. Leaves simple and opposite.
- d. Leaves of a pair practically of the same size.
- e. Flowers small, not appearing before the leaves;  
 stamens not more than 4; leaves not basally  
 3-5-plinerved.
- Plants without milky juice; bracts of inflo-  
 rescence eglandular .. .. 18. CHORIOPHYLLUM.
- Plants with milky juice; bracts of inflores-  
 cence with basal wartlike glands .. .. 61. EXCOECARIA.
- e'. Flowers large, appearing before the leaves;  
 stamens many; leaves basally 3-5-plinerved .. 46. TREWIA.
- d'. Leaves of a pair distinctly unequal .. 48. MALLOTUS.
- c". Leaves simple and alternate.
- d. Anthers peltate on disciform connectives and  
 imbricate to form a globose central tessellated  
 mass .. .. 45. BOTRYOPHORA.
- d'. Anther cells in superposed pairs on each side  
 of a broad triangularly produced connective;  
 the upper cell of each pair much the larger .. 50. PTYCHOPYXIS.
- d". Anther cells 2, equal, diverging downwards  
 from their apex .. .. 40. COELODEPAS.
- d"". Anther cells 2, equal, diverging upwards from  
 their base .. .. 37. CLAOXYLON.
- d"". Anther cells 2, equal and parallel or didy-  
 mous.
- e. Stamens fewer than 20.
- f. Calyx compressed, of 2 sepals .. .. 59. PIMELEODENDRON.
- f'. Calyx not compressed, sepals or lobes or  
 teeth more than 2.
- g. Rachis of inflorescence glandular.
- Plants with milky juice; stamens 3 .. 61. EXCOECARIA.
- Plants without milky juice; stamens 4-6 15. HYMENOCARDIA.
- g'. Rachis of inflorescence eglandular.
- h. Flowers in small axillary catkinlike spikes 16. APOROSA.
- h'. Flowers not in catkinlike spikes.
- j. Stipels present .. .. 41. ALCHORNEA.
- j'. Stipels 0.
- k. Undersurface of leaves minutely pellu-  
 cidly dotted .. .. 41. ALCHORNEA.
- k'. Undersurface of leaves not minutely  
 pellucidly dotted.

- Anthers large, compressed .. 20. DAPHNIPHYLLUM.  
 Anthers minute, not compressed .. 17. BACCAUREA.  
*e'*. Stamens more than 20, often very many.  
*f*. Filaments repeatedly branched. .. 55. HOMONOIA.  
*f'*. Filaments not branched, free on a central  
 receptacle.  
*g*. Sepals 5, much imbricate ... .. 57. GELONIUM.  
*g'*. Calyx valvately 3-6 lobed.  
 Flower clusters with about thrice as many  
 glumaceous bracts as flowers .. .. 47. KUNSTLERIA.  
 Flower clusters with not more bracts  
 than flowers and usually fewer; bracts } 48. MALLOTUS.  
 not glumaceous .. .. } 49. COCCOCERAS.  
*d'''*. Anthers of 3-4 minute equal locelli cruci-  
 formly arranged on face or apex of connective.  
*e*. Stamens 50-60, distinctly verticillate; connec-  
 tive shortly produced .. .. 51. CLEIDION.  
*e'*. Stamens not more than 30, usually much  
 fewer, not distinctly verticillate; connective  
 not produced.  
 Stamens not arising from a distinct clavate  
 receptacle .. .. 52. MACARANGA.  
 Stamens arising from a distinct clavate re-  
 ceptacle .. .. 53. ENDOSPERMUM.

## II.—FEMALE PLANTS.

- a*. Leaves compound, trifoliolate .. .. 19. BISCHOFIA.  
*a'*. Leaves simple, opposite.  
*b*. Leaves of a pair practically of the same size.  
*c*. Cells of ovary 2-ovuled .. .. 18. CHORIOPHYLLUM.  
*c'*. Cells of ovary 1-ovuled.  
 Plants without milky juice; lamina base 3-5-  
 plinerved; flowers large, appearing before the  
 leaves; ♀ flowers usually solitary on longe-  
 glandular peduncles .. .. 46. TREWIA.  
 Plants with milky juice; lamina base not 3-5-  
 plinerved; flowers small, not appearing before  
 the leaves; ♀ flowers many, in axillary glan-  
 dular bracteate spiciform racemes .. .. 61. EXCOECARIA.  
*b'*. Leaves of a pair distinctly unequal .. { 43. COELODISCUS.  
 .. { 48. MALLOTUS.  
*a''*. Leaves simple, alternate.  
*b*. Cells of ovary 2-ovuled.  
*c*. Petals present .. .. 3. ACTEPHILA.  
*c'*. Petals 0.  
*d*. Disk or glands present in flower.  
*e*. Ovary and fruit 1-locular .. .. 13. ANTIDESMA.  
*e'*. Ovary and fruit 2-4-locular.  
 Styles elongate; fruit a dehiscent capsule less  
 than 1 cm. in diam. .. .. 6. FLUEGGEA.

- Stigmas sessile; fruit drupaceous. indehiscent, more than 1 cm. in diam. .. 12. DRYPETES.
- d'. Disk or glands 0.
- e. Undersurface of leaves thickly gland dotted; fruit flattened, winglike .. 15. HYMENOCARDIA.
- e'. Undersurface of leaves eglandular; fruit not flattened or winglike.
- f. Fruit 1-celled, 1-seeded.
- g. Fruit drupaceous; albumen abundant; embryo very minute .. 20. DAPHNIPHYLLUM.
- g'. Fruit a 4-valved capsule; albumen very scanty or 0; embryo with large fleshy cotyledons .. 14. SCORTECHINIA.
- f'. Fruit 2-4-celled, several-seeded.
- Flowers and fruits axillary and sessile or shortly pedicelled on very short bracteate spikes; seeds without an ariloid coat .. 16. APOROSA.
- Flowers and fruits on racemiform panicles, + - pendent from leaf or leaf scar axils or from trunk; seeds with an ariloid coat .. 17. BACCAUREA.
- b'. Cells of ovary 1-ovuled.
- c. Flowers petaliferous.
- d. Inflorescence of terminal 2-3-chotomous cymes 22. ALEURITES.
- d'. Inflorescence of very long slender arched single terminal spiciform racemes .. 24. GALEARIA.
- d". Inflorescence of axillary or lateral fascicles or cymes or panicles, or if terminal not of 2-3-chotomous cymes nor of single spiciform racemes.
- e. Racemes or spikes glumaceously bracteate .. 30. AGROSTISTACHYS.
- e'. Floral bracts not glumaceous.
- f. Calyx greatly enlarging in fruit .. 29. DIMORPHOCALYX.
- f'. Calyx not enlarging in fruit.
- Fruit a drupe .. 25. MICRODESMIS.
- Fruit a capsule .. 32. OSTODES.
- c'. Flowers apetalous.
- d. Disk or glands present.
- e. Calyx valvate or dentate.
- f. Ovary and fruit usually 2-locular; stigmas subpeltate .. 53. ENDOSPERMUM.
- f'. Ovary and fruit usually 3-locular; stigmas subulate.
- Fruit sulcately 3-coccate, small, dehiscent .. 37. CLAOXYLON.
- Fruit globose, large, indehiscent .. 44. BLUMEODENDRON.
- e'. Calyx imbricate.
- Styles present; fruit capsular .. 56. CHAETOCARPUS.
- Stigmas sessile; fruit drupaceous .. 57. GELONIUM.
- d'. Disk or glands 0.
- e. Leaves stipellate .. 42. ALCHORNEA.

- e'. Leaves not stipellate.
- f. Under surface of leaves pellucidly punctate or granular glandular or lepidote.
- g. Under surface of leaves pellucidly punctate ; flowers in terminal spikes .. .. 41. *ALCHORNEA*.
- g'. Under surface of leaves granular glandular or lepidote ; flowers in axillary spikes or panicles.
- h. Flowers in single axillary spikes ; lower surface of leaves lepidote .. .. 55. *HOMONOIA*.
- h'. Flowers in axillary panicles ; lower surface of leaves + — granular glandular.
- Seeds carunculate .. .. 49. *COCCOCERAS*.
- Seeds ecarunculate .. .. { 48. *MALLOTUS*.
- .. .. { 52. *MACARANGA*.
- f'. Undersurface of leaves neither gland dotted nor pellucidly punctate.
- g. Bracts of inflorescence with a basal prominent wartlike gland .. .. 61. *EXCOECARIA*.
- g'. Bracts of inflorescence eglandular or only granularly gland dotted.
- h. Fruit capsular, not large.
- Calyx and ovary tomentose ; styles palmately branched .. .. 40. *COELODEPAS*.
- Calyx and ovary glabrous ; styles not palmately branched .. .. 51. *CLEIDION*.
- h'. Fruit drupaceous, large.
- Fruit ovoid, rufous-velutinoso .. 50. *PTYCHOPYXIS*.
- Fruit globose depressed, glabrous .. 59. *PIMELEODENDRON*.

### BRIDELIA, Willd.

Erect or scandent shrubs or trees. *Leaves* alternate, shortly petioled, caducously stipulate ; laminæ entire, elliptical, ovate or obovate or lanceolate, penni-nerved ; the nerves directed forward and outward, straight or with slight arching towards the margin to anastomose near it ; secondary nerves numerous, subparallel and at right angles to the laterals ; nervules numerous, fine, subparallel, at right angles to the secondary nerves ; ultimate nervation close, subquadrately reticulate. *Flowers* small, usually monoecious, collected in small subglobose clusters that are axillary or strung along the terminal twigs, sessile or shortly pedicelled, surrounded by minute scarious bracteoles ; calyx regularly 5-partite, sepals valvate ; petals 5, alternate with and much smaller than the sepals, attached just below and external to the outer edge of the disk, obovate or obcuneate, subentire or lobulate ; disk in the ♂ pulvinate or



saucer-shaped, in the ♀ lining the calyx tube and giving off an inner coronal lobed or dentate, rarely entire, + - conical annulus that encircles the upper part of the ovary and in fruit is adpressed to the outer portion of the disk. *Stamens* central, 5, with filaments united for some distance below to form a central column, free above and spreading; anthers ovoid, erect in bud, versatile, with parallel cells dehiscing longitudinally; *pistillode* surmounting the staminal column, subconical usually 2-lobed. *Ovary* bilocular; styles usually 2, free or united for a variable distance, bifid above. *Fruit* drupaceous, on a persistent calyx, ovoid or globose, small, with 2 incompletely dehiscent 1-2-usually 1-seeded pyrenes. *Seeds* with fleshy or membranous albumen; embryo straight or slightly curved; cotyledons foliaceous, complanate.

DISTRIB. Tropical Africa, India, Indo-China, Philippines, Malayan Archipelago, Polynesia, Australia.

Species about 50, of which 7 so far known from the Malayan Peninsula.

Flower-clusters in axils of stipular bracts;

♀ disk bristly in flower and fruit .. .. 1. *B. stipularis*.

Flower clusters without stipular bracts;

♀ disk glabrous.

Lamina lanceolate, glaucous or subglaucous on the

lower surface .. .. 2. *B. tomentosa*.

Lamina ovate or elliptic, not glaucous on the lower surface.

Lamina almost or entirely glabrous on the lower surface .. .. 3. *B. ovata*.

Lamina tomentose or finely adpressedly pubescent on the lower surface.

Fruits subglobose .. .. 4. *B. pustulata*.

Fruits elliptical.

Lamina softly rufous-tomentose on lower surface .. .. 5. *B. cinnamomea*.

Lamina minutely adpressedly pubescent on lower surface.

Flowers not very minute;

♀ petals rusty-hirsute .. .. 6. *B. Griffithii*.

Flowers very minute;

♀ petals glabrous or with only a hair

or two .. .. 7. *B. penangiana*.

1. *BRIDELIA STIPULARIS*, Bl. Bijdr., 597 (1825). A large subscandent fulvous-tomentose shrub, with moderately sized elliptical to oblong-orbicular leaves. *Twigs* alternate, terete, glabrescent below, densely fulvous-tomentose above, 1—4 mm. thick, with inter-

nodes 1—3 cm. long. *Laminæ* coriaceous, with acute or subacute or rounded apex, subacute or obtuse or subtruncate or subcordate base and entire or undulate margin, 2·5—12 cm. long, 1·5—9 cm. broad, dark brown on upper, paler brown on lower surface, sparsely fulvous-tomentose on upper surface and + — so on lower; midrib and nerves indented on upper surface, both nerves and nervules prominent on the lower; nerves 8—12; petiole terete, fulvous-tomentose, 8 mm. long; stipules broadly lanceolate, acuminate, fulvous-tomentose, 5—6 mm. long, 3—4 mm. broad. *Flowers* clustered in the axils or on long leafless but stipulate spikes or panicles; the clusters a few mms. in diam., with 8—12 buds in a cluster, + — suffructed by numerous small membranous broadly-lanceolate fulvous-tomentose bracteoles; usually only 1 or 2 buds in a cluster fully developing and usually only ♂ or only ♀ flowers in a cluster. ♂ *Flowers* shortly pedicelled, broadly ovoid acute in bud, 4 mm. long, exclusive of pedicel, and 5 mm. across; calyx divided about half way down, the lobes triangular or broadly lanceolate acute, greenish-yellow, shortly puberulous at the apex or glabrescent; petals shortly broadly clawed, broadly cuneate or obovate, with subtruncate or subacute subcrenulate apex, 2 mm. broad and rather less long; disk thick, sublobulate, projecting slightly beyond the base of the sepals; stamens scarcely equalling the sepals, glabrous; anthers oblong-ovate, less than 1 mm. long; pistillode filiform below and within the staminal tube, free above and ending in a narrowly ovoid glabrous apex. ♀ *flowers* resembling the ♂, but sessile and with petals scarcely clawed and mesially longitudinally sulcate on inner surface with a basal swelling on each side of the sulcus; annulus of the disk narrow, laciniate, with a ring of bristles immediately below it; ovary ovoid, glabrous, 1·5 mm. long, 1 mm. thick; styles 1·5 mm. long, flattened, glabrous, + — bifid; stigmas irregularly clavate, subtuberculate. *Fruit* oblong-ovoid, 1—1·2 cm. long, 8—9 mm. thick, glabrous, smooth, bluish-black; pyrenes subpyriform scaphoid, with flat or slightly concave centrally excavate ventral surface, convex and superiorly keeled dorsal surface, obtuse base and acute carinate apex, 9 mm. long, 6 mm. broad and 3·5 mm. thick, obscurely longitudinally ridged on basal half of dorsal surface. Mull. Arg. 494 in part; Hook. f. 270, in part; Gehrmann in Bot. Jahrbuch, XLI, Beibl. No. 95, 29; J. J. Smith, 315; Jabl. Pflanzenreich, IV, 147; VIII, 55.—*B. retusa* A. Juss. Tent. Euphorb. 27, t. 7, f. 22.—*B. Zollingeri* Miq. Fl. Ind. Bat. I, ii, 364.—*Cluytia stipularis* L. Mant. 127.

PENANG: Wallich 7878 N !. PERAK: S. 1380 !; Kinta River K.C. 813 !. PAHANG: Palau Rumpit, R. 2275 !. MALACCA: Griffith ! Maingay 415 !, 1369 !, R. 2119 !. JOHOR: Muar, C. !; Bukit Patani R. 11041 ! Batu Pahat, R. !. SINGAPORE: McPherson Road, R. 10913 !; Kalang, R. 11269 !

DISTRIB. India, Indo-China, Malayan Archipelago, Philippines, Tropical Africa.

The specimens quoted above agree with the specimen of *Cluytia stipularis* L. in the Linnean Herbarium. *Bridelia scandens* Willd., *Cluytia scandens* Roxb. have usually been given as synonyms of *B. stipularis*, but *B. scandens* is a distinct species as Gehrman points out, differing from *B. stipularis* in the absence of bristles from the female disk and in having smaller fruits.

2. *BRIDELIA TOMENTOSA*, Bl. Bijl. 597 (1825). A shrub or small tree, with closely arranged leaves, minute monoecious flowers in small sessile or subsessile axillary clusters, and pisiform fruits. Twigs terete, 1—2 mm. thick, + — rusty-pubescent and lenticellate; internodes .5—1 cm. long. *Laminae* lanceolate, with acute or sub-acuminate apex, rounded or subcuneate or cuneate base and sub-undulate margin, subcoriaceous, 2.5—11 cm. long, 1—4.5 cm. broad; upper surface dark brown, glabrous or sparsely rusty-pubescent on midrib and nerves: lower surface paler brown, glaucous or subglaucous, + — rusty-pubescent and with prominent midrib and nerves; nerves 8—12; petiole slender, subterete, rusty-pubescent or glabrescent, 3—4 mm. long; stipules narrowly subfalcately lanceolate acuminate, 3 mm. long, 1 mm. broad, — rusty pubescent. *Flower clusters* subglobose, 3—5 mm. in diam., with 10—30 flowers ♂ only or ♀ only or mixed, imbedded in but not suffructed by numerous minute membranous rusty-pubescent bracteoles. ♂ flowers in bud subglobose, about 1 mm. in diam., expanding to 3 mm., very shortly pedicelled, glabrous; calyx divided almost to base into 5 subequal broadly lanceolate or oblong-ovate sepals; petals less than half the size of sepals, attached below the outer edge of disk, subsessile, subflabelliform or subcuneate, sometimes biauriculate; disk circular pulvinate; stamens scarcely equalling the sepals. ♀ flowers slightly larger than the ♂, ovoid in bud, subsessile; calyx as in the ♂; petals minute, subsessile, obovate, subcrenulated disk glabrous, with subvertical membranous laciniately-margined annulus; ovary ovoid, compressed, less than 1 mm. long, glabrous; styles free to the base, terete, half as long as the ovary, shortly bifid; stigmas recurved, slightly irregularly thickened. *Fruit* globose ovoid, smooth, glabrous, bluish-black, 4—5 mm. in diam.

pyrenes subhemispherical, with flat or slightly concave ventral and convex carinate dorsal surface. Mull. Arg., 501; Hook. f., 271; J. J. Smith, 320; Gehrm, in Bot. Jahrbuch. XLI, Beibl. No. 95, 32; Jabl. in Pflanzenreich IV, 147. VIII, 58.—*B. Loureirii* Hook. and Arn. Bot. Beech. Voy. 211. ?*B. lanceaefolia* Roxb. Fl. Ind. III, 737. *B. rhamnoides* Griff. Notul. IV, 480. *B. lanceolata* Kurz in Nat. Tijdschr. Ned. Ind. XXVII, 45. *Amanoa tomentosa* Baill. Adans. VI, 336. *Cleistanthus lanceolatus* Mull. Arg. 507.

KEDAH: Langkawi, *C.*! PENANG: Wallich!, *Deschamps*! Government Hill, *C.* 112!, 146!. WELLESLEY: Jasek Gelugur, *R.* 6967!. PERAK: *S.*!; Larut, *K.C.* 2492!, 2676!, 5384!; Waterfall *R.* 2977!; Pankor, *R.* 7923!. SELANGOR: Klang, *Fox*!; Gua Batu *R.* 8202!. MALACCA: *Griffith* 4885!, *Maingay* 1370!, 1375!, *Hervey*!; Sungei Udang, *Holmberg* 864!, *Goodenough* 1679!; Panchor, *Goodenough* 1741!; Ayer Panas, *R.* 1572!. JOHOR: Bukit Muar, *Feilding*!. SINGAPORE: *Hullett* 105!, *K.C.* 991!, 1260!; Garden jungle, *R.* 9116!.

DISTRIB. India, Indo-China, Malayan Archipelago, Philippines, Australia.

3. *BRIDELIA OVATA*, Dcne. in Nouv. Ann. Mus. III, 484 (1834). A small tree, entirely glabrous except on lower surface of young leaves. Branches terete, 3—4 mm. thick, pale brown-cinereous to black; flowering twigs terete, 1—2 mm. thick, lenticellate, black internodes .5—1.5 cm. long. *Laminae* ovate, with acute or subacute apex, rounded or subcuneate base and entire margin, coriaceous, 2—10 cm. long, 1—5 cm. broad; upper surface glossy, green or brown-olivaceous, finely reticulate; lower surface dull, brown sparsely pubescent when young; midrib and nerves slender, reddish and prominent on both surfaces; nerves 8—12, connected by numerous subparallel primary nervules and the latter by numerous rather irregular secondary nervules; reticulation subquadrate; petiole subterete, slender, 4—6 mm. long; stipules subfalcately lanceolate-acuminate, ciliolately margined, 2 mm. long. Flower-clusters axillary and strung at intervals of .5—1.5 cm. along the flowering twigs, of only a few flowers, ♂ and ♀ mixed but usually one sex predominant, encircled at their bases with minute broadly ovate scarious bracteoles. ♂ flowers sessile, subconically ovoid in bud, 2 mm. long, 1.5 mm. across the closed and 4 mm. across the open flower; calyx divided halfway down into deltoid-lanceolate



sepals; petals 1 mm. long and broad, ovate or obovate, sublobulate or subentire; disk saucer-shaped; staminal column short; pistillode columnar. ♀ flowers sessile, subconically ovoid in bud, 3 mm. long; calyx divided less than halfway down, lobes narrowly deltoid; petals obovate, 1.5 mm. long, entire or with denticulate apex: annulus of the disk crenulately margined; ovary ovoid; styles short, bifid to the base; stigmas scarcely thickened. *Fruit* globose, 5—6 mm. in diam. smooth; pyrenes subhemispherical, with flat ventral and convex carinate dorsal surface, 5 mm. broad, 3 mm. thick. Mull. Arg. 495; Hook. f. 274; J. J. Smith 324; Gehrm. in Bot. Jahrbuch. XLI, Beibl. No. 95, 33; Jabl. in Pflanzenreich, l.c. 61.—*B. Curtisii* Hook. f. 273; *B. Kurzii* Hook. f. 273; *B. pedicellata* Ridley in Journ. Roy. Asiat. Soc. Straits Branch, No. 59, 167.

PERLIS: Bukit Lagi, R. 14889!

KEDAH: Langkawi, C. 3688!, 8326!. PENANG: Batu Ferengy, C. 1736!; Tulloh Bahang, C. 97!, 1500!

DISTRIB.: Malayan Archipelago, Australia.

In the Flora of British India, Hooker places this species amongst the doubtful and excluded ones, and gives a brief and not very accurate description of it. There are two sheets of the Timor plant in Kew Herbarium collected by Riedlé, on whose specimens Decaisne based his description of *B. ovata*. On one of the sheets have also been fixed indiscriminately a fragment and separate leaves of Wallich's No. 7888 "Cluytia from Burma," which is *B. burmanica* Hook. f. The nervation Hooker mentions under his description of *B. ovata* is unfortunately the nervation of *B. burmanica*. The real *B. ovata* in Kew Herbarium has only 8—12 nerves. The specimen referred to by Hooker as *B. ovata* Dene, procured by Kurz from the Buitenzorg Garden is merely a specimen so named by Kurz. It is certainly not *B. ovata* Dene., but I should say *B. minutiflora* Hook. f. I cannot distinguish *B. Curtisii* Hook. f. from *B. ovata* Dene. The material of *B. Curtisii* consists only of a single sheet in flower only, collected by Curtis at Tulloh Bahang, and could seem to be merely a male specimen of *B. ovata* Dene., Ridley's No. 8326, collected by Curtis at Langkawi has been referred by Williams (Bull. Herb. Boiss. 1905, 31) to *B. Kurzii* Hook. f. It appears to me to be exactly like the cotype sheets of *B. ovata* Dene., in Kew Herbarium. *B. Kurzii* Hook. f., seems to me in any case merely a form of *B. ovata* Dene., but the material of it is very scanty. Gehrman refers *B. Curtisii* Hook. f. to *B. Griffithii* Hook. f., which it does not at all resemble.

4. *BRIDELIA PUSTULATA*, Hook. f. 271. A tree with moderately sized leaves and minute flowers in dense subglobose axillary clusters. Twigs stout, angled or subterete, 2—4 mm. thick, postulately lenticellate, sparsely shortly setulosely rusty-pubescent or glabrescent; internodes 3—3 cm. long. *Laminæ* coriaceous, broadly

ovate, with abruptly acuminate apex, rounded or obtuse base and entire slightly revolute margin, 9.5—18 cm. long, 4—8 cm. broad; upper surface dark brown, glabrous, subnitid; lower clearer brown, rusty pubescent on the prominent midrib and nerves; nerves 9—13; petiole slender, glabrous or sparsely pubescent, subterete, 8 mm. long; stipules triangular-lanceolate, 3 mm. long, rusty pubescent. *Flower-clusters* .5—1 cm. in diam., with numerous flowers, ♂ only or ♀ only or mixed, suffused by numerous broadly ovate, scarious, rusty-pubescent bracteoles. ♂ *flowers* in bud globosely-ovoid, 1.5 mm. long, subsessile, glabrous; calyx divided more than halfway down into triangular lanceolate sepals; petals attached just below outer margin of disk, less than .5 mm. long, sessile, obovate, entire or emarginate; disk circular-pulvinate; staminal column short, glabrous; anthers less than .5 mm. long; pistillode the size of an anther, smooth, glabrous. ♀ *flowers* larger than the ♂, ovoid, subsessile, 3 mm. long; calyx as in the ♂, but with sepals puberulous at their apex; petals as in the ♂ but narrower; disk fleshy, with entire annulus; ovary ovoid, glabrous, scarcely 1 mm. long; styles 2 mm. long, united for more than half their length, sometimes one of them trifid; stigmas irregularly thickened. *Fruit* ovoid, 7 mm. in diam., glabrous, smooth, with one pyrene. Gehrm. in Bot. Jahrbuch. XLI, Beibl. No. 95, 38; Jabl. in Pflanzenreich l.c. 75.

PERAK: Goping K.O. 508!. SELANGOR: Kwala Lampur, no collector's name!. MALACCA: Maingay 1371!. JOHOR: Jaffaria, King!; Castlewood, R. 9167!. SINGAPORE: no collector's name, 2923!; Sungei Jurong, R. 3874!; Thompson Road, Hullett 5829!; Rogie, R. 10740!

5. *BRIDELIA CINNAMOMEA*, Hook. f. 273. A thorny subscandent shrub, with short rigid brachiate branchlets, moderately sized leaves and comparatively few-flowered clusters, axillary and spicate along the terminal twigs. *Branches* terete, 5—8 mm. thick, glabrous, pale brown, with small scattered prickles; twigs subterete, 10—20 cm. long, 2 mm. thick, pustulately lenticellate, pale brown and glabrous on the older parts, dark brown to almost black on the younger parts, sparsely rusty-pubescent or glabrescent; internodes 1—1.5 cm. long on the terminal flowering twigs, 2—3 cm. on the branches. *Laminae* thinly coriaceous, ovate, with acute or shortly acuminate apex, rounded base and entire margin, 3.5—8 cm. long, 2—5.5 cm. broad; upper surface dark-olivaceous, sparsely pubescent on midrib and nerves, subnitid; lower surface sparsely cinna-

mon-tomentose; midrib and nerves slender, prominent on lower surface; nerves 6—8; petiole slender, subterete, 6 mm. long, cinnamon-pubescent; stipules . . . . , *Flower-clusters* 5 mm. in diam., with numerous deep-red flowers, ♂ only or ♀ only, imbedded in a mass of minute, oblong-lanceolate, laciniately-margined scarious bracteoles. ♂ *flowers* pseudo-pedicellate, in bud conical above the pseudo-pedicel, 3 mm. long including the 1 mm. long pedicel, 1.5 mm. in diam., sparsely cinnamon-pubescent on outer, glabrous on inner surface; sepals ovate-lanceolate, half the length of the calyx; petals scarcely 1 mm. long, narrowly obcuneate, with obtuse base and usually a bristle on the lower surface; disk saucer-shaped; staminal column short; pistillode columnar. ♀ *flowers* sessile, ovate, 3 mm. long, 5 mm. in diam. when open; sepals as in the ♂; petals oblong or oblong-obovate, less than 1 mm. long, entire, bristly on the outer surface; disk glabrous, annulus submembranous, irregularly dentately margined; ovary pyriform, glabrous; style single short, stout, bifid, above; stigmas clavellate. *Fruit* ovoid, not seen mature, smooth.

Gehrm. in Bot. Jahrbuch. XLI, Beibl. No. 95, 38, under *B. Griffithii* Hook. f.; Jabl. in Pflanzenreich, l.c. 74.

PERAK: Kinta. 60—100 m., K.C. 7101!; other places in Perak, 60—200 m. K.C. 7960!, 7989!, 8392!, 10612!; Assam Kumbang, W. 2121!; Thaiping, W. 2391!. JOHOR: Kota Tinggi, R. 4157!. SINGAPORE: Seletar, R.!

#### DISTRIB. Malayan Archipelago.

Type sheet is K.C. 7101 from Kinta in Kew Herbarium. Under *B. cinnamomea*, Hooker quotes Perak *Scortechini* as well as Kinta (misprinted Kinta in the Fl. Brit. Ind.), *King's Collector*. In Kew Herbarium the sheets collected by Scortechini Nos. 1822 and 1823 are named by Hooker "*B. cinnamomea*," while the Kinta sheet, K.C. 7101 is named by him "*B. ? cinnamomea*." Scortechini's sheets agree with each other and with Haviland's No. 800 from Borneo. They differ altogether from the Kinta sheet, K.C. 7101, which on the other hand agrees with Haviland's Nos. 937 and 1858 from Borneo. Hooker's description of *B. cinnamomea* is based on the mixture of sheets, but as his description of *B. cinnamomea* as "a thorny shrubby creeper 10—15 feet long" is taken from the Kinta specimen ticket, the Kinta specimens are taken as the type, all the more so as the Scortechini sheets Nos. 1822 and 1823 named "*B. cinnamomea*" by Hooker in the Kew Herbarium and Haviland's No. 800—the latter in fruit—are a species of *Cleistanthus*, being *C. perakensis* Jabl. *B. cinnamomea* may be merely, as Gehrman considers it, a variety of *B. Griffithii* Hook. f. The two species are certainly very closely allied, both being scandent shrubs.



6. *BRIDELIA GRIFFITHII*, Hook. f., 272. A scandent shrub. *Branchlets* terete, glabrous, pale brown, minutely lenticellate, 3—6 mm. thick; young flowering twigs terete, glabrous or sparsely minutely rusty-pubescent near the nodes, dark brown to black, lenticellate, 1—3 mm. thick; internodes 5—3 cm. long. *Laminae* thinly coriaceous, ovate to broadly lanceolate, with shortly acuminate apex, entire margin and rounded to cuneate base, 4·5—12 cm. long, 2—6 cm. broad; upper surface glabrous, dark brown to dark olivaceous, subnitid, reticulate, with slender prominent midrib and nerves; lower surface dull, brown, sparsely and very minutely pubescent to almost glabrous; nerves 7—12; petiole slender, subterete, 6 mm. long, sparsely rusty-pubescent or glabrescent; stipules narrowly lanceolate, 3 mm. long, rusty-pubescent. *Flower-clusters* axillary and strung along the young twigs at 5—3 cm. long intervals, 6 mm. in diam. of numerous small congested flowers ♂ and ♀ mixed; bracteoles minute, broadly ovate acute, + — pubescent and subcarinate on outer, glabrous on inner surface. ♂ flowers shortly stoutly pseudo-pedicellate, globosely ovoid, 2 mm. long; calyx very sparsely pubescent to almost glabrous on outer, glabrous on inner surface, divided more than halfway down into deltoid sepals; petals less than 5 mm. long, obcuneate or subrhombic, subentire or irregularly lobulate, glabrous or with a bristle or two on outer surface; disk lining the calyx cup, entire; staminal column short; pistillode the size of an anther, glabrous. ♀ flowers in bud shortly bluntly fusiform, 2·5 mm. long; calyx rusty-pubescent on outer surface towards the base, glabrous towards apex of outer surface and on inner, divided about halfway down into deltoid sepals; petals 5 mm. long, ovate or obovate, entire, somewhat fleshy, subcarinate and + — rusty-hirsute on outer surface, glabrous on inner; disk sublobulately margined, with crenulate annulus; ovary ovoid, compressed, glabrous; styles short, subterete, glabrous; stigmas irregularly subspatulately thickened. *Fruit* . . .

Gehrm. in Bot. Jahrbuch. XLI, Beibl. No. 95, 38; Jabl. in Pflanzenreich, l.c. 74. PERAK: S. MALACCA: *Griffith*!

Type sheets are those quoted, which are in Kew Herbarium.

7. *BRIDELIA PENANGIANA*, Hook. f. 272. A tree 5—15 m. high, with spreading branches. *Branchlets* terete, pale-brown, glabrous, pustulate, 2—5 mm. thick; flowering twigs slender, terete, black, lenticellate, glabrous or sparsely rusty-pubescent near the nodes; internodes 5—3 cm. long. *Laminae* membranous or thinly coria-

ceous, broadly or narrowly ovate or obovate or broadly lanceolate or oblanceolate, with shortly, sometimes abruptly, acuminate apex and rounded to cuneate base, 4—14 cm. long, 3—7.5 cm. broad; upper surface brown to dark-olivaceous or almost black, glabrous, nitid, boldly reticulate, with slender prominent midrib and nerves; lower surface dull, brown to dark-olivaceous, finely sparsely rusty-pubescent especially on the slender prominent nerves and midrib; nerves 8—12; petiole subterete, slender, 6 mm. long, glabrous or with a few rusty hairs; stipules minute, lanceolate rusty-pubescent. *Flower-clusters* axillary and strung along the young shoots at 1.5—3 cm. long intervals, subglobose, 4—6 mm. in diam. of numerous minute flowers ♂ and ♀ mixed, but usually one sex predominating; bracteoles minute, ovate, acute, subfimbriate, + - rusty-pubescent and subcarinate on outer surface, glabrous on inner. ♂ flowers subsessile, subglobose ovoid in bud, 1 mm. long; calyx pubescent on outer surface, glabrous on inner, divided more than halfway down into deltoid sepals; petals very minute, obovate or obcuneate; disk lining the calyx cup, entire; glabrous; staminal column short; pistillode the size of an anther, glabrous, ♀ flowers subsessile obovoid, 2 mm. long; calyx as in the ♂; petals less than .5 mm. long, subspathulately obovate, subentire, glabrous or with a few hairs on outer surface; annulus of the disk dentate; ovary ovoid, compressed, glabrous; styles united below for a variable distance, glabrous; stigmas irregularly thickened. *Fruit* with subacute or acute ends, smooth, 7 mm. long, 4 mm. thick, with one elliptical pyrene. *B. minutiflora*, Hook. f. 273; Gehrm. in Bot. Jahrbuch. XLI, Beibl. No. 95, 38; J. J. Smith, 310; Jabl. in Pflanzenreich, l.c. 75.

PENANG: *K.C.* 1350!; Government Hill, 150 m. *C.* 527!; Waterfall, *C.* 1719!. PERAK: *S.*!; Ulu Kerling, *K.C.* 8576!; Penara Bukit, *R.* 7920!

DISTRIB. Lower Burma, Malayan Archipelago.

Type sheet is *C.* 527.

I am unable to detect any specific or even varietal difference between *B. penangiana* and *B. minutiflora*. Hooker refers to *B. minutiflora* as a very remarkable species on account of the solitary style. An examination of the type sheets has failed to yield a single flower with a solitary style. All the type flowers examined had styles of the ordinary character, united for a variable distance from the base and each bifid above. Hooker's description appears therefore to have been based on one or several abnormal flowers, or possibly confused with that of *B. cinnamomea*, which has a single style, and which itself as far as Hooker's names in Kew Herbarium are concerned, is a mixture of a *Bri-*



*delia* and a *Cleistanthus*. See note under *B. cinnamomea*. Gehrmann unites *B. penangiana* with *B. Griffithii*, a course that I am not disposed to follow. *B. Griffithii* has considerably larger flowers than *B. penangiana* and is a scandent shrub, whereas *B. penangiana* is a tree reaching to a height of 16 m.

#### CLEISTANTHUS, Hook. f.

Shrubs or trees, with terete or subterete branchlets rarely angled and with alternate, bifarious, caducously or persistently stipulate, shortly-petioled leaves. *Laminae* entire, penninerved; nerves subopposite or alternate, at acute angles with the midrib, directed outwards and forwards with + - curving usually to anastomose in loops near the margin, rarely (in *C. bracteosus*) distinct to the margin; cross-nervules subparallel to irregular; reticulation irregularly polygonal. *Flowers* monoecious, with a + - turbinate or obconic torus, small, in axillary bracteolate clusters, often strung along small-leaved twigs. ♂ *flowers* with calyx divided halfway or rather more than halfway down into 4—5 sepals valvate in bud or slightly imbricate at the apex; petals 5, minute, + - spathulate or ovate or obovate or cuneate, with entire or subcrenulate margin; stamens 5, inserted on a usually short column surrounding the subconically ovoid entire or shortly trifid pistillode; anthers erect in bud, introrse, dehiscing longitudinally, dorsi-fixed, versatile; disk lining the lower part of calyx, entire or + - dentate. ♀ *flowers* with calyx and corolla as in the ♂ and persistent in fruit; ovary 3-locular; styles 3, free or + - connate, shortly bifid rarely simple; disk lining the lower part of calyx and giving off an inner crenulate, dentate, or + - lobed annulus, which surrounds the ovary and + - conceals it; staminodes 5, extremely minute, scalelike, in a circle at base of inner surface of disk. *Fruit* a dry 3-locular 3-sulcate capsule, sessile on or + - stipitate from the persistent perianth, dehiscing into 3 bi-valved rounded cocci, leaving a central columella with pentagonal base; cocci each with a mesial sutural line; endocarp horny, separable from the thin pericarp. *Seeds* subtrigonously ovoid, with a convex subcarinate dorsal surface and two ill-defined ventro-lateral surfaces, smooth, glabrous; apex subacute; base obtuse and often excavate; albumen mostly scanty; cotyledons broad, folded. **DISTRIB.** Tropical Africa, India, Ceylon, Indo-China, Philippines, Malayan Archipelago, Australia. Species about 80.

Flower clusters in axils of bialate bracts .. .. 1. *C. bracteosus*.

Flower clusters not in axils of bialate bracts.

Flowers elongate, slenderly pseudopedicellate; fruits

on long slender pedicels .. .. 2. *C. pedicellatus*.

Flowers sessile or subsessile; fruits sessile or only on short pedicels.

(a) Lamina glabrous on lower surface.

\*Lamina glaucous on lower surface.

Lamina ovate, apex abruptly caudate . 3. *C. glaucus*.

Lamina lanceolate elongate, gradually acuminate.

Lamina membranous, upper surface dull 4. *C. membranaceus*.

Lamina coriaceous, upper surface nitid 5. *C. nitidus*.

\*\*Lamina not glaucous on lower surface.

†Calyx pubescent or hirsute in flower and fruit.

Lamina membranous, greenish yellow .. 6. *C. flavescens*.

Lamina coriaceous, not greenish yellow.

Petals hirsute .. 7. *C. hirsutopetalus*.

Petals glabrous.

Lamina base rounded or subcordate .. 8. *C. podocarpus*.

Lamina base acute .. 9. *C. glandulosus*.

††Calyx glabrous in flower and fruit.

§Flower clusters minute, of few flowers on very slender glabrous paniculate branchlets.

Lamina membranous .. 10. *C. malaccensis*.

Lamina coriaceous.

Lamina lanceolate, thrice as long as broad, gradually acuminate .. 11. *C. heterophyllus*.

Lamina ovate, not thrice as long as broad, abruptly caudate .. 12. *C. gracilis*.

§§Flower clusters not minute, not on slender glabrous paniculate branches.

Stipules persistent, aculeate .. 13. *C. siamensis*.

Stipules caducous.

Lamina base rounded .. 14. *C. parvifolius*.

Lamina base acute.

Lamina of moderate size, membranous .. 15. *C. decurrens*.

Lamina very large, coriaceous .. 16. *C. macrophyllus*.

(b) Lamina + - pubescent or tomentose on lower surface.

\*Lamina glaucous on lower surface.

Petiole very stout, densely tomentose 17. *C. lanuginosus*.

Petiole not stout, not densely tomentose.

Nerves 10—15 .. .. 18. *C. hirsutulus*.

Nerves 5—8.

Lamina base acute; petiole 5—6

mm. long .. .. 19. *C. praetermissus*.

Lamina base rounded; petiole

2 mm. long.

Lamina apex rounded or shortly acuminate; nerves at an angle of  $60^{\circ}$  with midrib and distinctly curved

20. *C. polyphyllus*.

Lamina apex caudate; nerves at an angle of  $45^{\circ}$  with midrib, almost straight .. ..

21. *C. Maingayi*.

\*\*Lamina not glaucous on lower surface.

†Pubescence very minute and very closely adpressed, rusty or silvery.

Nerves fewer than 8.

Lamina base acute .. 22. *C. vestitus*.

Lamina base rounded .. 23. *C. Kingii*.

Nerves 12—20 .. 24. *C. myrianthus*.

Nerves 8—10 .. 25. *C. pseudomyrianthus*.

††Pubescence not very minute, not very closely adpressed.

Pubescence rufous.

Lamina base and apex acute; pubescence sparsely ramentaceous .. ..

26. *C. ellipticus*.

Lamina base rounded, apex shortly abruptly acuminate; pubescence not ramentaceous .. ..

27. *C. rufus*.

Pubescence not rufous.

Flower clusters often closely crowded on very short spiciform branchlets; aculeate .. ..

20. *C. polyphyllus*.

Flower clusters not closely crowded; bracteoles not aculeate.

Nerves 10—15, distinctly curved .. ..

19. *C. hirsutulus*.

Nerves 6—8, almost straight.. 21. *C. Maingayi*.

1. *CLEISTANTHUS BRACTEOSUS*, Jabl. in Pflanzenreich IV. 147; VIII, 41; (1915). A small tree. *Branchlets*, stramineous-brown, glabrous, 4—8 mm. thick; flowering twigs lateral from the branchlets, 5—15 cm. long, 1—2 mm. thick, rusty scurfily-pubescent or glabrescent; internodes 5—1.5 cm. long. *Laminae* coriaceous, oblong, oblanceolate or oblong-ovate, 16—40 cm. long, 6—13 cm. broad, with caudately acuminate apex and narrowly to broadly cuneate or round base; upper surfaced olivaceous, subnitid, glabrous, obscurely reticulate, with slender indented midrib and nerves; lower surface dull, pale cinnamon to almost silvery, very finely closely adpressedly pubescent, except on midrib and nerves, with minute rusty hair-like scales sparsely interspersed, the prominent midrib and nerves glabrous or sparsely minutely ramentaceous; nerves 14—20, distinct to the margin; cross nervules numerous, close, subparallel, connected irregularly to form a rather open and transversely elongate irregularly polygonal reticulation, petiole very stout, subterete, glabrous, closely wrinkled, 1.5—2 cm. long; stipules not seen. *Flower-clusters* strung along the flowering twigs at short intervals, each in the axil of a stipuliform bract, of rather few flowers and one sex predominating in a cluster; bracts broadly ovate, acute, 7 mm. long and broad, + — rufous-pubescent and often mesially narrowly bialate on the outer surface, glabrous and smooth on the inner; the mesial dorsal alae sometimes united by their inner margin and prolonged into an abrupt caudiform apex; bracteoles broadly ovate, thinly membranous or almost hyaline, glabrous except for a few minute adpressed rufous hairs on the subcarinate outer surface. ♂ *flowers* seen only in young bud; entirely glabrous sepals lanceolate; petals ovate. ♀ *perianth* seen only in fruiting stage, sessile, ovoid, 4—5 mm. long, entirely glabrous; sepals deltoid; petals obovate-spathulate, 1 mm. long; annulus of the disk irregularly dentate; ovary not seen. *Capsule* on a stout, terete, glabrous, 8 mm. long pedicel, the base of which is surrounded by the remains of the perianth, glabrous, crimson turning black, obscurely reticulate, 9 mm. long, 1.3 cm. broad. *Seeds* cordate-ovate, 7 mm. long, 6 mm. broad, 4—5 mm. thick, slightly compressed antero-posteriorly, with convex ecarinate dorsal, and 2 subconvex ventro-lateral surfaces separated by a rounded ridge which has a small irregular hilar depression at its lower end; surface of seed, brownish-black, glabrous, not quite smooth; apex rounded; base cordately retuse.



PERAK: *S.* 1777!, 1917!, 1919!; *W.* 3648!; Kota Bahru, *K.C.* 926!; Goping, *K.C.* 8169!

The type sheets are in Kew Herbarium. This species has been confused with *C. macrophyllus*, Hook. f., from which it differs in the much larger leaves with their finely pubescent undersurface and in the presence of stipular bracts.

2. *CLEISTANTHUS PEDICELLATUS*, Hook. f. 281. A small tree, everywhere glabrous on the vegetative parts, except for a few minute adpressed hairs on very young shoots and on the lower surface of very young leaves, and for rarely a few minute hairs at the base of adult leaves. *Branchlets* pale to dark-brown, 3—5 mm. thick; young twigs, 1—2 mm. thick, black. *Laminae* coriaceous, broadly lanceolate to ovate or oblong-elliptic, 4—12 cm. long, 1.5—5 cm. broad, boldly closely reticulate on both surfaces, with midrib and nerves indented on the upper and prominent on the lower, with subcaudately acuminate apex and cuneate base; upper surface dark-olivaceous to almost black, subnitid; lower surface dark brown, dull to subnitid; nerves 5—7, anastomosing near the margin; cross-nervules irregular, somewhat distant and scarcely distinguishable in the general close reticulation; petiole subterete, shallowly channelled on upper surface, closely transversely wrinkled, 4 mm. long; stipules caducous, minute, narrowly deltoid. *Flower-clusters* axillary, of 20 or more pseudo-pedicellate flowers, ♂ or ♀ only in a cluster; bracteoles minute, ovate, acute, + — dorsally carinate, pubescent or glabrescent on outer surface, glabrous on inner. ♂ *flowers* in bud clove-shaped, glabrous, with an elongated pedicelliform calyx-tube, .5—1 cm. long including the tube, 2 mm across the globosely ovoid top, which is divided into lanceolate sepals; petals subquadrate, with irregularly 2—3-dentate apical marginal disk lining the expanded apical portion of the calyx tube; staminal column short; pistillode short, stout, obscurely trigonously columnar, with obtuse obscurely trilobed apex. ♀ *perianth* seen only in fruit, glabrous; calyx as in the ♂; petals ovate acute or lanceolate, entire, 1.5 mm. long; annulus of the disk membranous, dentate; ovary hirsute; tube of calyx in fruit up to 1.3 cm. long, forming a slender pseudo-pedicel to the capsule. *Capsule* not seen mature, 7 mm. in vertical, 8 mm. in transverse diam., sparsely rusty-hirsute to glabrescent. *Seeds* not seen. *Jabl. in Pflanzenreich*, l.c. 44.

PENANG: *K.C.* 1794!, 1501!; Government Hill, 200—300 m. *C.* 169!, 1401!; West Hill, 300 m. *C.* 3599!; Penang Hill, *Hullett*!.  
PERAK: *Thaipeng, W.* 2375!



The type sheet is *Curtis* 169 in Kew Herbarium.

3. *CLEISTANTHUS GLAUCUS*, Jabl. Pflanzenreich, IV, 147. VIII, 25. (1915). A tree, 10—13 m. high. *Branchlets*, dark-brown, glabrous, somewhat rough or grooved, + - pubescent, 2—5 mm. thick; young flowering twigs a few centimetres long, lateral, 1 mm. thick-grooved and ridged longitudinally, fuscous-tomentose, bearing leaves much smaller than the ordinary ones; internodes 3—5 mm. long. *Laminae* on branches and branchlets coriaceous, ovate or oblong, ovate, 4.5—12 cm. long, 1.5—4.5 cm. broad, with shortly caudately acuminate apex and rounded to subcordate base, glabrous and obscurely reticulate on both surfaces except for a few hairs near base of midrib on lower; upper surface subnitid, olivaceous; lower surface glaucous; nerves slender, 6—7, anastomosing near the margin; cross nervules distant, irregular; petiole scarcely 2 mm. long, subterete, closely transversely wrinkled, sparsely rusty-pubescent or glabrous; *laminae* on flowering twigs not exceeding 2 cm. long and 1 cm. broad, + - pubescent on lower surface; stipules subulate-aculeate, rigid, black, 4 mm. long, sparsely rusty-pubescent or glabrous. *Flower-clusters* axillary, strung at short intervals along the small-leaved twigs, of few flowers ♂ only or ♀ only; bracteoles broadly ovate acute, + - carinate and rusty-pubescent on outer, glabrous on inner surface. ♂ *flowers* not seen. ♀ *flowers* ovoid; calyx pubescent on outer, glabrous on inner surface, sepals deltoid; petals spathulate or obcuneate, acute or subacute, subentire, 1 mm. long, glabrous; annulus of the glabrous disk dentate, membranous; ovary ovoid, densely hirsute. *Capsule* not seen entire, sparsely hairy, obliquely closely shallowly grooved. *Seeds* not seen.

PERAK: Goping, *K.C.* 4526!; locality illegible, *R.* 7926!

The type sheet is *K.C.* 4526 in Kew Herbarium.

4. *CLEISTANTHUS MEMBRANACEUS*, Hook. f. 278. A tree up to 10 m. high, with slender hanging branches. *Branchlets* pale-brown, glabrous, 2—5 mm. thick; flowering twigs 1—2 mm. thick, angular, grooved, + - rusty-pubescent. *Laminae* membranous, narrowly lanceolate, with caudately acuminate apex and acute or subacute base, 3.5—18 cm. long, 1—5.5 cm. broad; upper surface glabrous or slightly rusty-pubescent on basal end of midrib, olivaceous, dull, reticulate; lower surface at first very finely sparsely adpressedly pubescent, finally glabrous, subglaucous; midrib and nerves slender; nerves 10—15, anastomosing near the margin; cross-nervules ir-

regular; petiole slender, subterete, closely transversely wrinkled, + - setulosely rusty-pubescent, 4 mm. long; stipules persistent, scarious, aculeate, rusty-pubescent to glabrous, 5-8 mm. long. *Flower-clusters* strung along the twigs at intervals of .5-1.5 cm., of fairly numerous flowers, ♂ only or ♀ only; bracteoles ovate, acute, rusty-pubescent on outer, glabrous on inner surface. ♂ *flowers* clove-shaped in bud, pseudo-pedicellate, 2.5 mm. long, 1-2 mm. in diam., sepals ovate, acute, sparsely pubescent or glabrous; petals very minute, broadly obovate, glabrous; staminal column short; pistillode columnar, obscurely 3-ridged, pubescent. ♀ *flowers* sessile, globosely ovoid, 2 mm. long, sparsely pubescent or glabrescent; sepals deltoid; petals ovate entire, glabrous, less than .5 mm. long; annulus of the disk membranous, crenulate; ovary globosely ovoid, hirsute; styles very short, free; stigmas scarcely thickened. *Capsule* sessile, + - adpressedly rusty-pubescent, 8 mm. in vertical 1 cm. in transverse diam.; cocci sparsely setulosely puberulous on inner surface. *Seeds* cordate-ovate, 6 mm. long and broad, 4 mm. thick, glabrous, blackish-brown, obscurely ridged, with convex carinate dorsal and sub-bilateral ventral surface, obtuse apex and cordately excavate base. Jabl. in Pflanzenreich, l.c. 26.—*C. stipulatus*-Hook. f. 281.

PENANG: Penang Hill, R.!. PERAK: W. 3257!; Larut, K.C. 1974!, 3355!, 3424! 6619!

The type sheets are K.C. 3355 and 6619 in Kew Herbarium. Hooker's *C. stipulatus* (K.C. 1974) is merely a mature fruiting specimen of *C. membranaceus*. The capsule of K.C. 1974 is not quite glabrous, but pubescent at base and apex like most of the so-called glabrous capsules.

5. *CLEISTANTHUS NITIDUS*, Hook. f. 280. A small tree. *Branchlets* pale-brown, 2-3 mm. thick, + - pubescent towards the apex, glabrous lower down; young twigs 1 mm. thick, terete, fulvous or rusty-tomentose; internodes 1-2 cm. long. *Laminae* thinly coriaceous, lanceolate, 5-15 cm. long, 1.8-5 cm. broad, with caudate acuminate apex and subtruncate or obtusely rounded or almost subcordate base; upper surface glabrous, olivaceous, subnitid, reticulate; lower surface dull, brown-olivaceous, subglaucous, very sparsely and finely adpressedly pubescent or glabrous; midrib indented and nerves slightly prominent on upper, both prominent on lower surface; nerves 8-12, anastomosing near the margin; cross-nervules irregular; petiole rather stout, subterete, fulvous-tomentose or glabrescent, 5 mm. long; stipules not seen. *Flower-clusters*

axillary, 4 mm. in diam., rufous-tomentose, of ♂ or of ♀ flowers only; bracteoles ovate, acute or subacute, carinate, + — rusty-tomentose on outer surface, glabrous on inner. ♂ flowers sessile, obpyriform in bud, 2 mm. long; calyx rufous-tomentose externally, glabrous internally, with deltoid sepals; petals broadly flabelliform crenulate, glabrous, 5 mm. across the apex; disk smooth, entire; staminal column short, stout, glabrous; pistillode pubescent at the base, deeply trifid. ♀ flowers with calyx of the ♂; petals obovate, subentire, 1 mm. long and broad, glabrous; annulus of the disk membranous, dentate and later 5-lobed; ovary subglobose, densely hirsute; styles slender, free, bifid halfway down; stigmas subclavate. *Capsule* on a very short stout pedicel that is almost concealed by the perianth, 8 mm. in vertical, 9 mm. in transverse diam., at first rufous-tomentose, later glabrescent and reticulate. *Seeds* cordiform, 6 mm. long, 4.5 mm. broad, 3 mm. thick, with convex carinate dorsal and 2 obscurely defined ventro-lateral surfaces obtuse apex and cordately excavate base.

Jabl. in Pflanzenreich, l.c. 28, *C. Curtisii*, Jabl. l.c. 22.

PENANG: K.C. 1348!, *C.* 3002!; Government Hill, *C.* 146!, 1575!, 3048!; Waterfall, *C.* 1464!; Batu Ferengy, *C.* 3588!. SINGAPORE: Lobb!

The type sheets are *Curtis* 146, and Lobb's sheet, both in Kew Herbarium.

6. *CLEISTANTHUS FLAVESCENS*, Jabl. in Pflanzenreich, IV, 147; VIII, 19; (1915). A small tree, 5 m. high. *Branchlets* glabrous pale brown, 2—5 mm. thick; young twigs, darker brown, 1 mm. thick, sparsely shortly puberulous or glabrescent; buds rusty-tomentose. *Laminæ* membranous or thinly coriaceous, elliptic, 5—15 cm. long, 2—6 cm. broad, with finely acuminate apex and acute or cuneate base; upper surface yellowish-green, glabrous, subnitid, reticulate; lower surface dull, yellowish-green, glabrous or with sparse, very minute, adpressed, hair-like scales on midrib and nerves and general surface; nerves slender, 7—10, anastomosing near the margin, often with a minute triangular pit in the nerve-midrib axil; cross-nervules distant, rather irregular and not very distinct from the general moderately close reticulation; petiole slender, subterete, + — setulosely puberulous, 4—8 mm. long, closely irregularly wrinkled; stipules caducous, aculeate, a few mms. long, rusty-pubescent to glabrous. *Flower-clusters* axillary along the young twigs, small, of few flowers ♂ only or ♀ only; bracteoles broadly ovate, with

caudate apex, + - rusty-pubescent on outer, glabrous on inner surface. ♂ *flowers* seen in bud only, ovoid, sessile; calyx rusty-pubescent externally, glabrous internally, sepals deltoid; petals subquadrate, apiculate; staminal column short; pistillode short, stout, subtrigonously columnar, with obtuse, obscurely 3-lobed apex. ♀ *flowers* sessile, ovoid, 3.5 mm. long; calyx as in the ♂; petals flabelliform with subcrenulate apical margin, less than 1 mm. long; disk subcrenulate, with annulus reduced to a very narrow irregularly dentate membranous ring, scarcely separable from the disk; ovary globose ovoid, densely hirsute; styles short, slender, glabrous; stigmas recurved, subspathulately thickened. *Capsule* not seen mature, sessile, 7 mm. in vertical and transverse diameters, pale brown, obscurely obliquely closely grooved, + - adpressedly hairy.

PERAK: Goping, K.C. 686!; Sundeng Keledang, R. 9578!.

The type sheet is K.C. 686 in Kew Herbarium. See note under *C. glandulosus*.

7. *CLEISTANTHUS HIRSUTOPETALUS*, Gage in Kew Bull. No. 7 (1914), 239. A tree about 10 mm. high. *Branchlets* and young twigs, glabrous, the former dark brown, lenticellate 2—3 mm. thick, the latter pale-brown, 1—2 mm. thick; internodes 1—3.5 cm. long. *Laminae* coriaceous, narrowly ovate-elliptic or lanceolate, 7—18 cm. long, 3—5.5 cm. broad, glabrous, with subcaudately acuminate apex and rounded or subcuneate base, which in the latter case is contracted above the petiole, with 2 small pulvinate swellings at the petiolar junction; upper surface pale olivaceous to brown, nitid, with slender midrib, obscure nerves and reticulation very obscure; lower surface dull and paler than upper, with nerves and reticulation less obscure; nerves 6—8, anastomosing near the margin; cross nervules few, irregular, scarcely distinguishable from the general reticulation; ultimate reticulation visible only by transmitted light, very close, subquadrate; petiole subterete, glabrous, closely transversely wrinkled, 3—7 mm. long; stipules caducous, lanceolate, 3 mm. long, glabrous or with a few minute hairs. *Flower-clusters* axillary, of rather few flowers, ♂ only or ♀ only; bracteoles ovate or lanceolate, + - rusty-pubescent and subcarinate on outer surface, glabrous on inner. ♂ *flowers* not seen. ♀ *flowers* sessile, ovoid, 6 mm. long; calyx adpressedly hairy externally, glabrous internally, with deltoid or lanceolate sepals; petals obovate, entire, 1.5 mm. long, adpressedly hirsute on outer surface, the hairs extending beyond the apex, glabrous on inner; annulus of the disk mem-



branous, dentate; ovary subglobose ovoid, hirsute. *Capsule* sub, sessile on a stout, 3 mm. long, obconically terete, sparsely adpressedly hirsute pedicel that is almost concealed by the perianth, sparsely hirsute at the base, otherwise glabrous, smooth, light-brown, 1 cm. in vertical diam. *Seeds* suborbicularly ovoid, 8 mm. long, 7 mm. broad, 5 mm. thick, with convex subcarinate dorsal and 2 ill-defined ventro-lateral surfaces.

PENANG: Penaru Bukit, C. 3049!; Bukit Tumiary, no collector's name, 1420 (1655)!. All type sheets.

8. *CLEISTANTHUS PODOCARPUS*, Hook. f. 281. A tree 12—16 m. high. *Branchlets* angled, scurfily-pubescent to glabrescent, 2—3 mm. thick; young twigs rusty-tomentose. *Laminae* coriaceous, oblong-lanceolate, 7—22 cm. long, 2.5—7.5 cm. broad, with acuminate apex and subcordate base; upper surface olivaceous, glabrous, subnitid, with indented midrib and nerves; lower surface dull, olivaceous, glabrous or + — scurfily-pubescent on basal part of the stout midrib; nerves and midrib prominent; nerves 7—9, anastomosing near the margin; petiole stout, subterete, + — rusty-pubescent, 7 mm. long; stipules caducous, minute, triangular, rusty-pubescent. *Flower-clusters* axillary, of few comparatively large flowers, ♂ or ♀ only; bracteoles broadly ovate, rusty-pubescent on outer surface, glabrous on inner. ♂ *flowers* not seen. ♀ *flowers* sessile, ovoid, 8 mm. long, 4 mm. in diam.; calyx rusty-pubescent on outer, glabrous on inner surface, sepals deltoid; petals obcnate, glabrous, 1.5 mm. long, with rounded crenulate apical margin; annulus of disk not distinctly seen; ovary globose ovoid, densely hirsute; styles free, short, somewhat stout and flattened, tomentose at the base, glabrous above; stigmas subspathulately thickened. *Capsule* on a short, stout, terete, pubescent pedicel, that scarcely exceeds the perianth, rusty-villose, 8 mm. in vertical, 1 cm. in transverse diam.; cocci closely obliquely shallowly ridged and furrowed. *Seeds* not seen. Jabl. in *Pflanzenreich*, l.c. 29.

PERAK: Larut, K.C. 3277!, 3297!, 6427!, 6450!, 6685!, 6701!, 7740!.

The type sheet is 3277 in Kew Herbarium.

9. *CLEISTANTHUS GLANDULOSUS*, Jabl. in *Pflanzenreich*, IV, 147; VIII, 18; (1915). *Branchlets* dark-brown, glabrous, 2—3 mm. thick; flowering twigs subterete or angled, glabrous or rusty-pubescent near the nodes. *Laminae*, coriaceous, elliptic-lanceolate, 4.5—6



cm. long, 1.5—3.5 cm. broad, with acuminate apex and acute or cuneate base; upper surface olivaceous, subnitid, obscurely reticulate, with slender midrib and nerves; lower surface brown, glabrous or with a few hairs near base of midrib, dull, reticulate, with nerves and midrib prominent; nerves 6—8, anastomosing near the margin; cross-nervules irregular, scarcely distinguishable; ultimate reticulation visible only by transmitted light, fine, close; petiole subterete, glabrous or sparsely setulose, closely transversely wrinkled, 6—8 mm. long; stipules subpersistent, subulate to aculeate, rigid, rusty-pubescent to glabrous, 6 mm. long. *Flower-clusters* axillary, of rather few flowers with one sex predominant; bracteoles broadly ovate, with abruptly caudate apex, + — rusty-pubescent and subcarinate on outer surface, glabrous on inner or with a few basal hairs. ♂ *flowers* shortly pseudo-pedicellate, obpyriform in bud, 3 mm. long; calyx pubescent externally, glabrous internally, sepals deltoid; petals subrhombic to subreniform, glabrous, crenulate; retuse or apiculate, less than .5 mm. long; disk glabrous, with subcrenulate margin, glandular opposite the petals; staminal column short; pistillode subconically ovoid with obtusely trifid apex. ♀ *flowers* and *fruit* not seen.

PERAK: Gunong Keledang, R. 9578 !.

The number 9578 has also been given to a specimen of *C. flavescens* Jabl. from Sundeng Keledang. See under *C. flavescens*.

10. *CLEISTANTHUS MALACCENSIS*, Hook. f. 277. *Twigs* brown, 1—3 mm. thick, glabrous or fulvous-tomentose or sparsely rusty-pubescent near the apices. *Laminae* subcoriaceous, lanceolate, 5.5—14 cm. long, 4 cm. broad, with acuminate apex and acute or cuneate base, glabrous, dark-brown on upper, paler brown on lower surface; nerves 4—6 anastomosing near the margin; cross nervules numerous, close, subparallel; petiole slender, glabrous, subterete, 5—6 mm. long; stipules not seen. *Flower-clusters* axillary and strung at short intervals along slender short simple or longer paniculately branched lateral twigs, 2—3 mm. in diam., with few minute flowers; bracteoles ovate, glabrous on inner surface, with easily removed scurfy fulvous scale-like hairs on outer. ♂ *flowers* sessile, ovoid in bud, 2 mm. long, glabrous; sepals ovate; petals spathulate; disk circular pulvinate; pistillode subconically columnar, caducously rusty tomentose, obscurely 3-lobed. ♀ *flowers* in bud conically ovoid, glabrous, 2 mm. long; sepals lanceolate; petals oblong-obovate, glabrous, less than .5 mm. long, entire; annulus of

the disk narrow, membranous, dentate; ovary ovoid, caducously hirsute; styles simple. *Capsule* on a terete, glabrous, 5 mm. long pedicel, glabrous, 8 mm. in vertical, 9 mm. in transverse diam, *Seed* trigonously ovoid, glabrous, brownish-black, 6 mm. long, 4 mm. broad, 3 mm. thick, with convex carinate dorsal and 2 irregular ventro-lateral surfaces, obtuse base and subacute apex. Jabl. in Pflanzenreich, IV, 147. VIII, 32.

MALACCA: *Maingay* 1373! type sheet in Kew Herbarium.

SINGAPORE: Chu Chu Kang, R. 4586!; Seletar, R. 6169!.

11. *CLEISTANTHUS HETEROPHYLLUS*, Hook. f. 276. A tree, entirely glabrous, except the bracteoles, ovary and sometimes the flowering twigs. *Branches* flexuous, 1—3 mm. thick, greyish-brown; flowering twigs sometimes sparsely setulosely puberulous; internodes 5—1.5 cm. long. *Leaves* large on the branches, small and caducous. on the flowering twigs; *laminæ* of the large leaves coriaceous, lanceolate, 7—16 cm. long, 2.5—7 cm. broad, with long acuminate apex and subcuneate base; upper surface brown-olivaceous, subnitid, obscurely reticulate; lower surface dull, brown; midrib prolonged to extreme tip; nerves obscure on upper surface, 4—7, anastomosing near the margin; cross-nervules indistinct; reticulation well defined; petiole subterete, slender, 5 mm. long; stipules not seen; *laminæ* on flowering twigs 1.5—2.7 cm. long, 4—6 mm. broad, lanceolate, with sub-acuminate, acute or subacute apex and subcuneate base. *Flower-clusters* axillary and strung at 6—8 mm. intervals along the lateral and terminal small-leaved twigs, 3—4 mm. in diam., of few minute flowers, ♂ and ♀ mixed; bracteoles scarious or membranous, deciduously bristly on outer surface, glabrous on inner. ♂ *flowers* sessile, ovoid, glabrous, 2 mm. long; sepals deltoid or lanceolate; petals obovate, less than .5 mm. long; disk circular pulvinate; pistillode with 3-lobed apex. ♀ *flowers* turbinate, sessile, 3—4 mm. long, glabrous; sepals deltoid; petals narrowly obovate, retuse or subentire, .5 mm. long; ovary ovoid, bristly hirsute; styles short, free, as long as the ovary; stigmas slightly thickened. *Capsule* on a very short stout pedicel that scarcely exceeds the perianth, 1.2 cm. in both diameters, pale brown, glabrous except for scattered hairs at base, apex and in the sulci. *Seeds* ovoid, compressed, smooth, brown, 8 mm. long, 6 mm. broad, 5 mm. thick, with a convex subcarinate dorsal, 2 ill-defined ventro-lateral surfaces, and obtuse apex and base. Jabl. in Pflanzenreich, l.c. 14, *C. laevis* Hook. f. 277. PAHANG: Pulau Tiunan, *Burkill* !.

MALACCA ! *Maingay* 1372 ! ; Bukit Bruang, *C.* !. SINGAPORE North Singapore, *K.C.* 5 ! ; Changi, *R.* 3417 ! ; Botanic Garden, *Murton* !, *R.* 3418 ! ; Bajau, *R.* 6247 ! ; Sungei Jurong, *R.* 6744 !.

*C. laevis* was founded on a solitary and poor specimen, which I am unable to distinguish from *C. heterophyllus*, also founded on a solitary and poor specimen. The presence or absence of the small leaves is no criterion of specific difference as they are caducous. The appearance of the reticulation on the lower surface varies with the age of the leaf. In young leaves the nerves and nervules appear as yellowish and "unfinished" on a light chocolate background; in older leaves the reticulation is distinct and similar in all the specimens to that of the type of *C. heterophyllus*.

12. *CLEISTANTHUS GRACILIS*, Hook. f. 277. A small bushy tree 5—8 m. high ; twigs divaricate, glabrous, 1—2 mm. thick. *Laminae* subcoriaceous, lanceolate, 2·5—6·5 cm, long, 1—3 cm. broad, with acuminate or caudate apex and acute base, entirely glabrous ; upper surface brown-olivaceous, subnitid, lower yellowish-brown, dull ; nerves 5—7, anastomosing near the margin ; petiole slender, subterete, 3—4 mm. long ; stipules not seen. *Flower-clusters* 2—5 mm. in diam., of comparatively few flowers, ♂ and ♀ mixed, bracteoles ovate, hirsute on outer, glabrous on inner surface. ♂ *flowers* sessile, ovoid acute in bud, 2 mm. long, glabrous, sepals unequal, 2 short deltoid and 3 longer lanceolate ; petals extremely minute, spatulate ; disk circular pulvinate, sublobulate ; pistillode columnar, undivided, caducously scurfy-tomentose. ♀ *flowers* sessile, larger than the ♂, 2·5—3 mm. long, fusiform in bud, glabrous ; sepals subequal, lanceolate ; petals linear-oblong or subspathulate, less than ·5 mm. long ; disk lining the obconical calyx cup and extended above it as 5 broad subdentate + — connivent lobes ; ovary ovoid, densely hirsute ; styles short, united at the base, undivided ; stigmas clavellate. *Capsule* sessile, 8 mm. in diam., sparsely hairy at the base. *Seeds* ovoid-oblong, 5 mm. long, 4 mm. broad, 3·5 mm. thick, with convex carinate dorsal and 2 ventro-lateral irregular sub-convex surfaces. *Jabl. in Pflanzenreich*, l.c. 15, *C. dasyphyllus* Williams in *Bull. Herb. Boiss.* 1905, p. 31. *PERLIS* : *R.* 14908 ! *Kedah* : *K.C.* 1709 ! ; *Langkawi*, *C.* 2810 !. *PAHANG* ; *Kota Glanggi*, *R.* 2301 !

The type sheet is *K.C.* 1709 in Kew Herbarium. *Curtis* No. 2810, on which Williams founded *C. dasyphyllus* seems to me merely a specimen of *C. gracilis*, with a predominance of male flowers. The adult leaves are broader in proportion to their length in *Curtis*' specimens than in the type of *C. gracilis*, but the younger leaves are alike in both.



13. *CLEISTANTHUS SIAMENSIS*, Craib in Kew Bull. 71 (1913) shrub or small tree, 3—6 m. high. *Branchlets* dark brown, 2—3 mm. thick, glabrescent; flowering twigs 1—2 mm. thick, grooved, + — shortly rusty or fulvous pubescent; internodes 5—3 cm. long. *Laminae* coriaceous, lanceolate, 4—16 cm. long, 1—4.5 cm. broad with acute or acuminate apex and obtusely cuneate base, concolorous, pale green-olivaceous; upper surface shiny, reticulate, glabrous with a few minute hairs on base of midrib; lower surface dull, glabrous or sparsely pubescent on the prominent nerves and midrib nerves 10—16, anastomosing near the margin; cross-nervules not distinguishable from the moderately close reticulation; petiole subterete, sparsely puberulous or glabrescent, 2 mm. long, closely transversely wrinkled; stipules persistent, subulate aculeate, sparsely puberulous or glabrous, 5—6 mm. long. *Flower-clusters* 3—7 mm. in diam., of comparatively few flowers, ♂ and ♀ mixed; bracteoles ovate, subulate, carinate and hirsute on outer surface, glabrous on inner. ♂ *flowers* subglobose, sessile, 3 mm. long, entirely glabrous, sepals deltoid; petals flabelliform, less than 1 mm. long, with irregularly crenulate or lacerate apical margin; disk lining the calyx cup sublobulate; pistillode subtrigonously columnar, with 3-fid apex, caducously scurfy-pubescent. ♀ *flowers* globosely ovoid, sessile, 3—mm. long, with perianth as in the ♂; disk subcrenulate; annular very membranous, narrow, below the upper edge of the disk and closely adherent to inner surface of disk as to be scarcely distinguishable; ovary subglobose, densely hirsute; styles free, slender short, terete glabrous, shortly bifid; stigmas subspathulately thickened. *Capsule* sessile, hirsute at base and apex and in the sulci otherwise glabrous or with only a few scattered hairs, reticulate 7 mm. in vertical, 1 cm. in transverse diam. *Seed* not seen. Jabl. in Pflanzenreich, l.c. 23. *C. penangensis* Jabl. in Pflanzenreich, l.c. 21.

PENANG: *K.C.* 1673!; Waterfall, *C.* 1481!; Penang Hill, *R.*! .  
Balik Pulau, *R.* 12730!

DISTRIB. Siam.

The type sheet is *K.C.* 1673 in Kew Herbarium. The species has been confused with *C. membranaceus*, but differs from the latter in having coriaceous leaves not glaucous on lower surface but shiny on the upper, and in having larger flowers with different petals.

14. *CLEISTANTHUS PARVIFOLIUS*, Hook. f., 281. A tree, 10—13 m. high, with spreading branches, glabrous on all the vegetative



parts. *Branchlets* pale yellowish-brown, 2—4 mm. thick; internodes 1—2 cm. long; flowering twigs 1 mm. thick. *Laminæ* membranous or thinly coriaceous, elliptical or oblong-ovate or oblong obovate, 4—9 cm. long, 1.5—3 cm. broad, with acute or subacuminate apex and rounded base; both surfaces somewhat dull, the upper dark olivaceous, obscurely reticulate, with indented midrib and slightly elevated nerves, the lower greenish-brown, with very slender nerves and prominent midrib; nerves 10—15, anastomosing near the margin; cross-nervules much broken up and scarcely distinct from the general open reticulation; ultimate nervules very fine, forming a close subquadrate reticulation; petiole subterete channelled above, 5 mm. long, transversely wrinkled; stipules not seen. *Flower-clusters* strung along the short lateral twigs, of few flowers, ♂ or ♀ only; bracteoles not seen. ♂ *flowers* not seen ♀ *perianth* seen in fruit only; sepals deltoid-lanceolate; petal obovate-spathulate, with subcrenulate or retuse apical margin, 1—1.5 mm. long, glabrous; disk glabrous; annulus not seen; ovary hirsute. *Capsule* sessile, hirsute at base and apex, otherwise glabrous, light-brown. *Seeds* not seen. Jabl. in Pflanzenreich, l.c. 11.

PERAK: Goping, K.C. 4540! the type sheet in Kew Herbarium.

15. *CLEISTANTHUS DECURRENS*, Hook. f. 278. A many-stemmed shrub, 3—6 m. high, with arched branches. *Branchlets* 2—4 mm. thick, pale yellowish-brown, glabrous, lenticellate; young twigs, very young leaves and buds + — rusty-tomentose or pubescent. *Laminæ* subcoriaceous, oblong-elliptic or broadly lanceolate or oblanceolate, 7—17 cm. long, 2—7 cm. broad, with acute or acuminate apex and cuneate base narrowing subcaudately to the petiole; upper surface olivaceous, glabrous, subnitid, reticulate, lower dull green, glabrous or sparsely adpressedly scurfy on the midrib and nerves; the latter slender and slightly indented or upper, stouter and raised on lower surface; nerves 5—7, anastomosing near the margin; cross-nervules irregular and rather widely spaced; reticulation fairly open; petiole 5—6 mm. long, channelled above, closely transversely wrinkled, rusty-tomentose to glabrescent; stipules minute, triangular, + — rusty-pubescent. *Flower-clusters* strung along the lateral twigs, 3—4 mm. in diam., of ♂ and ♀ flowers mixed; bracteoles membranous, ovate, the inner ones rusty-tomentose, the outer ones glabrescent and dorsally carinate. ♂ *flowers* ovoid in bud, 3—4 mm. long, subsessile; calyx

glabrous or pubescent at the tip with lanceolate sepals; petals very shortly clawed, 1 mm. long, glabrous, obcuneate or obovate, with truncate or rounded erosulate apex; disk a broad fleshy glabrous annulus adherent to upper part of calyx cup; pistillode stout columnar, obscurely 3-ridged and obtusely trifid, caducously scurfy ♀ flowers sessile, conically ovoid in bud, 3—4 mm. long, with glabrous perianth and disk; sepals lanceolate; petals sessile, obovate, entire, 1 mm. long; annulus of disk narrow, membranous, sublobulate; ovary ovoid, densely hirsute; styles free, short, bifid stigmas spathellate. *Capsule* on a 5—7 mm. long terete, glabrous or sparsely hairy pedicel, 7 mm. in vertical, 9 mm. in transverse diam. at first sparsely tomentose, later glabrous except for a few hairs at base and apex and in the sulci; cocci glabrous internally. *Seed* not seen. Jabl. in Pflanzenreich, l.c. 33.

PENANG: Batu Ferengy, *C.* 3657!.; PERAK: *S.* 1745!, 1916 x Goping, *K.C.* 476!; Larut, *K.C.* 4285!, 4637!

The type sheets are *Scortechini* 1745 and 1916, and *K.C.* 476, all in Kew Herbarium.

16. *CLEISTANTHUS MACROPHYLLUS*, Hook. f. 278. A tree 1-m. high, with spreading branches, glabrous on all vegetative parts. *Twigs* brown, 2—5 mm. thick. *Laminæ* thinly coriaceous, narrow to broadly oblong-ovate or elliptical or broadly lanceolate or oblanceolate, 14—30 cm. long, 5—10 cm. broad, with subcaudately acuminate apex and cuneate base; upper surface glossy deep-green when fresh, olivaceous and subnitid when dry, boldly reticulate, lower surface greenish-brown, sub-vernicoose; midrib prominent on both surfaces, more so on lower; nerves 10, anastomosing near the margin; cross-nervules irregular, wide apart; reticulation somewhat bold and open; petiole 6—8 mm. long, corrugulate; stipule minute, caducous, lanceolate. *Flower-clusters* strung along the lateral-twigs, 6—7 mm. in diam., of numerous flowers, ♂ and ♀ mixed bracteoles ovate, acute, carinate, + — tomentose on outer surface, glabrous on inner. ♂ flower ovoid in bud, shortly pedicellate,

rounded or subtruncate, crenulate apex; disk projecting usually beyond the calyx-cup, thick, fleshy, lobulately dentate; annulus given off about halfway up, membranous; ovary ovoid, densely hirsute; styles short, stout, shortly bifid; stigmas irregularly clavate. *Capsule* on a stout, terete, glabrous, .8—1 cm. long, pedicel 9 mm. in vertical, 1.5 cm. in transverse diam., glabrous except for a few hairs at base and apex and in the sulci. *Seeds* seen only immature, ovoid, corrugulate, 7 mm. long, 5 mm. broad, 4 mm. thick. *Jabl. in Pflanzenreich*, l.c. 35.

PERAK: *S.* 1759!; Goping, *K.C.* 4314!, 6182!; SINGAPORE! Bukit Timah, *R.* 6478!, 6518!, 10,441!

The type sheet is *Scortechini* 1759 in Kew Herbarium.

17. *CLEISTANTHUS LANUGINOSUS*, *Jabl. in Pflanzenreich*, IV, 147; VII, 26; (1915). *Branchlets* dark-brown, irregularly scurfy-pubescent or glabrescent, 3—5 mm. thick; young twigs 2—3 mm. thick, densely fulvous-tomentose; internodes 1.5—3 cm. long. *Laminæ* thinly coriaceous, elliptic-lanceolate, 12—22 cm. long, 4—7 cm. broad, with acuminate apex and cuneate base; upper surface olivaceous, glabrous or + — pubescent on midrib, subnitid, reticulate; lower surface dull, glaucous, villose especially on the prominent midrib, nerves and nervules glabrescent; nerves 10—12 anastomosing near the margin; cross-nervules rather distant, connected by a rather open network; ultimate reticulation visible only by transmitted light, close, subquadrate; petiole very stout, 8 mm. long, 2—3 mm. thick, densely fulvous-tomentose; stipules persistent, ovate acuminate to subulate, + — rigid, fulvous-tomentose at first, later glabrescent; .7—1 cm. long. *Flower-clusters* 1—1.5 cm. in diam., of few rather large flowers, ♂ and ♀ mixed; bracteoles rather large, ovate, acute or acuminate, + — hirsute and subcarinate on outer surface, glabrous on inner. ♂ *flowers* subsessile, ovoid in bud, turbinate when open, 7 mm. long; sepals deltoid or lanceolate, + — hirsute on outer surface, glabrous, on inner; petals subcuneately obovate, 1 mm. long, glabrous, apical margin irregularly dentate; disk lining the calyx cup, glabrous, entire; staminal column 3 mm. long, glabrous; pistillode ovoid, glabrous, 3-fid. ♀ *flowers* subglobose ovoid; calyx as in ♂; petals obovate subacute or subrhombic, subcrenulate, glabrous, 2 mm. long; annulus membranous; ovary subglobose ovoid, densely hirsute; styles connate below, short, slender, glabrous, shortly 2-fid; stigmas slightly subspathulately thickened. *Capsule* not seen mature, deciduously hirsute.

JOHOR: Mt. Ophir, *Hullett* 779!, the type sheet in Kew Herbarium.

18. *CLEISTANTHUS HIRSUTULUS*, Hook. f. 278. A tree, 10—14 m. high, with spreading branches. *Branchlets* brown, glabrous 2—3 mm. thick; flowering twigs 1 mm. thick, angled and grooved or subterete, rusty-tomentose; internodes 5—1.5 cm. long. *Laminæ* membranous, obovate-oblong, 3.5—13 cm. long, 1.5—5 cm. broad, with subcaudately acuminate apex and rounded or obtusely cuneate base; upper surface olivaceous, subnitid, reticulate rusty-pubescent on basal half of midrib, otherwise glabrous; lower surface dull green, subglaucous, rusty-pubescent on midrib and basal margin, very sparsely adpressedly pubescent on nerves and general surface or glabrescent; midrib and nerves slender; nerves 10—15, anastomosing near the margin; cross-nervules irregular and often broken up by subsidiary lateral nerves; petiole scarcely 2 mm. long, rusty-pubescent; stipules persistent, acicular, 5 mm. long, rusty-pubescent. *Flower-clusters* strung along the twigs, of fairly numerous ♂ and ♀ flowers mixed; bracteoles ovate, acute, carinate and + — rusty-pubescent on outer, glabrous on inner surface. ♂ *flowers* fusiform in bud, 3 mm. long; calyx pubescent externally glabrous internally; sepals deltoid; petals shortly clawed, suborbicular, crenulate, 5 mm. long and broad; disk lining calyx cup, subcrenately margined; pistillode hirsute, ovoid, with subacute 3-fid apex. ♀ *flowers* 5 mm. long, fusiform in bud; calyx cup turbinate; sepals lanceolate, pubescent externally, glabrous internally; petals 1 mm. long, oblong-obovate, subcrenulate; annulus of the disk setulosely pubescent on outer surface; ovary globosely ovoid, densely hirsute; styles united for half their length, slender, terete, glabrous, 2-fid; stigmas slightly clavate. *Capsule* sessile, 9 mm. in vertical, 1.3 cm. in transverse diam., + — adpressedly rusty-pubescent. *Seeds* roughly ovoid, 5 mm. long and broad. *Jabl.* in *Pflanzenreich*, l.c. 26.

PERAK: *S.* 1260!, *K.C.* 7412!, 7453!; Goping, *K.C.* 4562!, 5870!; Sungei Larut, *W.* 2481!. PAHANG: *R.* 2299!. SINGAPORE: Bukit Timah, *R.* 6514!

As Hooker points out, this species is allied to *C. membranaceus*, but is distinguished from it by the more pubescent calyx, the different form of the petals, and the shiny upper surface of the leaves.

19. *CLEISTANTHUS PRAETERMISSUS*, Gage in Kew Bull. No. 7 1914, p. 240. *Branchlets* pale-straw, glabrous, pustulate, 2—4 mm.



thick. *Laminae* membranous, elliptical, lanceolate, 8—13 cm. long, 3—5 cm. broad, with long acuminate apex and acute or cuneate base; upper surface dark brown-olivaceous, glabrous, subnitid, obscurely reticulate; lower surface dull-brown, + - glaucous, + - hirsute on midrib and nerves, which are slender and prominent on lower, and indented on upper surface; nerves 6—8; cross-nervules somewhat distant and irregular, connected by an open reticulation; ultimate reticulation, visible only by transmitted light, close; petiole slender, glabrous, closely wrinkled, 5—6 mm. long; stipules not seen. *Flower-clusters* axillary and on short lateral spiciform twigs, small, of few flowers, ♂ or ♀ only; bracteoles minute, ovate, acute or acuminate, + - adpressedly hirsute and carinate on outer surface, glabrous on inner. ♂ *flowers* not seen. ♀ *flowers* sessile ovoid, with glabrous perianth; sepals deltoid or lanceolate; petal shortly clawed, subspathulately obovate, subcrenulate, 1.5 mm. long; disk and membranous annulus glabrous; ovary subglobose ovoid, hirsute; styles united at the base, short, subterete, glabrous shortly bifid; stigmas subspathulate. *Capsule* sessile, 8 mm. in vertical, 11 mm. in transverse diam., glabrous except for a few hairs at apex, base and in the sulci, black, polished, obscurely reticulate. *Seeds* brown and yellow mottled, smooth, 6 mm. long, 5 mm. broad and 4 mm. thick, with subacute apex and obtuse excavate base.

DINDING: Gunong Tungul, R. 9440!

20. *CLEISTANTHUS POLYPHYLLUS*, Williams in Bull. Herb. Boiss. 2<sup>me</sup> Ser. V, 31 (1905). A small bushy tree, 3—5 m. high, with numerous, closely-ranked, rather small leaves. *Branchlets* dark-brown, glabrous or scurfy-pubescent, 2—5 mm. thick; flowering twigs 1 mm. thick, + - rusty or yellowish-pubescent; internodes 5—2 cm. long. *Laminae* thinly coriaceous, broadly lanceolate or ovate or obovate, 5—8 cm. long, 1—3 cm. broad, with acute or shortly acuminate apex and rounded or subcuneate base; upper surface pale olivaceous to dark brown, subnitid, + - pubescent on midrib, otherwise glabrous, obscurely reticulate, with very slender midrib and nerves; lower surface dull, pale olivaceous to light-brown, + - glaucous, + - pubescent especially on the slender prominent nerves and midrib; nerves 5—7; petiole slender, hirsute, 2 mm. long; stipules persistent, subulate to finely aculeate, at first pubescent, then glabrous, 5—8 mm. long. *Flower-clusters* axillary and also spiciformly congested on short lateral twigs, of rather few and

large, 3—5 mm. long, lanceolate-aculeate, + — hirsute and carinate on outer surface, glabrous on inner. ♂ flowers ovoid, 4—5 mm. long; calyx hirsute externally, glabrous internally, with deltoid or sub-lanceolate sepals; petals rhombic, 1 mm. long and broad, sub-crenulate, glabrous or with a few bristles externally in bud; disk lining calyx cup; pistillode subconically columnar, bluntly trifid, glabrous, minutely papillose. ♀ flowers ovoid, 6 mm. long; calyx hirsute externally, glabrous internally, sepals lanceolate-acuminate or almost aculeate; petals 1.5 mm. long, obovate, with truncate subcrenulate apical margin and a few bristles on outer surface; annulus of the disk first dentate, later obscurely lobed; ovary globosely ovoid, densely hirsute; styles united below, slender terete, glabrous, shortly bifid; stigmas slightly thickened. *Capsule* sessile, 7 mm. in vertical, 8 mm. in transverse diam., adpressedly hirsute. *Seeds* not seen. Jabl in Pflanzenreich, l.c. 24. *C. trichocarpa* Ridley in Journ. Roy. Asiat. Soc. Straits Br. No. 59, 167 and No. 61, 58.

SETUL: *R.* 14886 !. PERLIS: *R.* 14885 !. KEDAH: Langkawi, *C.* 2795 !, 8306 !; Bukit Penang, *R.* 14884 !; Rawei Island, *R.* 15730 !; locality illegible, *R.* 15731 !; Burau Bay, *R.* 15793 !. PENANG. Penang Hill, *R.* 10209 !. PERAK: Trong, *K.C.* 1389 !

The type sheet is *Curtis* 2795 in Kew Herbarium.

21. *CLEISTANTHUS* MAINGAYII, Hook. f., 280. *Branchlets* 2—3 mm. thick, pale to dark brown, + — rusty-pubescent; young lateral twigs 1 mm. thick, short, densely rusty-tomentose; internodes .5—1 cm. long. *Laminae* coriaceous, oblong-ovate or oblong-obovate, 4.5—12 cm. long, 2—5 cm. broad, with shortly caudately acuminate apex and rounded or almost subcordate base; upper surface glabrous subnitid, olivaceous, with rather obscure midrib nerves and reticulation; lower surface in young leaves densely rusty-tomentose, in older leaves glaucous or light dull brown, sparsely adpressedly pubescent, with prominent midrib, nerves and reticulation; nerves 6—8; cross-nervules irregular; petiole 3 mm. long, closely wrinkled, + — rusty-pubescent; stipules persistent, acicular, 4 mm. long, + — rusty-pubescent. *Flower-clusters* rusty-tomentose, of comparatively few sessile flowers ♂ or ♀ only; bracteoles broadly ovate, slenderly caudately acuminate, rusty-tomentose on outer, glabrous on inner surface. ♂ flowers elongate ovoid, 3—5 mm. long; calyx adpressedly hirsute; sepals lanceolate with acute, acuminate or aculeate, finally recurved apex; petals shortly clawed, 1 mm. long, subquadrate or broadly spatulate with subcrenulate apex, sparsely

bristly tomentose on outer surface, glabrous on inner; disk lining the calyx cup, thin, glabrous subcrenulate; pistillode columnar, subtrigonal, glabrous, obscurely 3-lobed. ♀ flowers subglobose ovoid or spindle-shaped in bud, 5 mm. long; calyx as in the ♂; petals 2 mm. long, broadly shortly clawed, ovate or obovate, subentire, sparsely hirsute on outer surface, glabrous on inner; annulus of the disk narrow, glabrous, membranous, sub-lobulate; ovary globose ovoid, densely hirsute; styles free, slender, short, adpressedly hirsute on outer surface, glabrous on inner, shortly bifid; stigmas recurved, subspathulately thickened. *Capsule* (seen only in fragments) about 1 cm. in both diameters, apparently sessile, sparsely and rather adpressedly tomentose. Jabl. in Pflanzenreich, l.c. 25.

PERAK: S.!. MALACCA: *Maingay* 1374!; Ayer Keroh, R.!

The type sheet is *Maingay* 1374 in Kew Herbarium.

22. *CLEISTANTHUS VESTITUS*, Jabl. in Pflanzenreich, IV, 147; VII, 32; (1915). *Branchlets* pale brown, cinereous or leprose glabrous, 4—7 mm. thick; flowering twigs 1—2 mm. thick, + — densely fulvous-tomentose; internodes 8—2 cm. long. *Laminae* membranous or thinly coriaceous, elliptic-lanceolate or oblanceolate 5.5—15 cm. long, 2.5—5.5 cm. broad, with long acuminate apex and acute or cuneate base; upper surface glabrous, brown; lower finely densely adpressedly cinnamon-pubescent; midrib and nerves slender obscure on upper surface, prominent on lower; nerves 6, directed with very slight curving forward and outward to the margin; cross-nervules numerous subparallel, close towards the base and often bifurcating; reticulation obscure; petiole 4—6 mm. long, densely fulvous-tomentose; stipules not seen. *Flower-clusters* axillary and also strung along the flowering twigs at short intervals, subglobose of rather few small flowers, ♂ or ♀ only; bracteoles minute, ovate, densely rufous-tomentose. ♂ flowers sessile, ovoid, glabrous, 3 mm. long; sepals lanceolate; petals obcuneate, scarcely 1 mm. long, with retuse or apiculate apical margin; disk lining the deep calyx cup glabrous; pistillode stout, columnar, 3-lobed, in bud caducously scurfy-hairy, finely papillose. ♀ flowers and capsule not seen. *Bridelia cinnamomea*, Hook. f. 273, in part.

PERAK: S. 1822!, 1823!. JOHOR: Muar, C. 3610!. SINGAPORE: Botanic Garden, R. 13463!.

DISTRIB.—Borneo, *Haviland* 800!.



See note under *Bridelia cinnamomea*. Jablonsky places the Peninsula specimens as a form of *C. vestitus*.

23. *CLEISTANTHUS KINGII*, Jabl. in Pflanzenreich, IV, 147; VIII, 40; (1915). A small tree, 3—5 m. high, with spreading branches. *Branchlets* pale brown, glabrous, 3—5 mm. thick; young twigs stramineous, glabrous; internodes 2—3 cm. long. *Laminae* coriaceous, ovate, 11—15 cm. long, 4—8 cm. broad, with acuminate apex and rounded to subcuneate base; upper surface green, glabrous, subnitid, reticulate; lower surface greenish-brown, dull, very finely and closely adpressedly velutinose, reticulate; midrib and nerves slender; nerves 5—7; cross-nervules rather distant and irregular, sometimes scarcely distinguishable from the general open reticulation; petiole slender, glabrous, 7—8 mm. long, closely wrinkled stipules not seen. *Flower-clusters* few, of ♂ or ♀ flowers only bracteoles minute, ovate, entirely glabrous. ♂ *flowers* not seen. ♀ *perianth* seen only in fruit, sessile, ovoid; calyx entirely glabrous with lanceolate sepals; petals broadly subspathulately obovate shortly clawed, subcrenulate, 5 mm. long; disk and annulus glabrous; ovary not seen. *Capsule* on a stout, glabrous, 5—7 mm. long pedicel, 8 mm. in vertical, 1.1 cm. in transverse diam., glabrous.

PERAK: Larut, K.C. 3064!, 6863!.

The type sheets in Kew Herbarium.

24. *CLEISTANTHUS MYRIANTHUS*, Kurz For. Fl. 370 (1877). *Branches* 3—7 mm. thick, glabrous below, scurfy-pubescent higher up; young twigs 2—3 mm. thick, fulvous tomentose at first, later scurfy-pubescent; internodes 5—2.5 cm. long. *Laminae* coriaceous; lanceolate, 10—30 cm. long, 3.5—10 cm. broad, with acuminate apex and rounded base; upper surface glabrous, subnitid, olivaceous, reticulate; lower surface finely adpressedly velutino-pubescent-rusty to subsilvery; nerves 12—20; petiole 1 cm. long, + - fulvous or subsilvery tomentose, transversely wrinkled; stipules minute, adpressed, triangular, rusty-tomentose. *Flower-clusters* in the axils of leaves and branches, 5—1 cm. in diam., of numerous flowers, ♂ and ♀ mixed; bracteoles broadly ovate, fulvous-tomentose on outer surface, glabrous on inner, subfimbriate. ♂ *flowers* ovoid in bud, subsessile, 3—4 mm. long, glabrous; sepals deltoid; petals broadly obcuneate, 5 mm. long; pistillode conically ovoid, acute, trisulcate with trifid apex. ♀ *flowers* larger than the ♂, subsessile turbinate, 4—5 mm. long, glabrous; sepals deltoid or lanceolate;



petals very shortly clawed, obovate or subrhombic, acute, 1 mm. long; annulus entirely concealing the ovoid, glabrous ovary; styles united at the base, glabrous, very shortly bifid; stigmas clavellate. *Capsule* on a short stout pedicel, subglobose and 1 cm. in diam., glabrous, brownish-black. *Seeds* ovoid, compressed, black, glabrous, 5 mm. long, 4 mm. broad and 3 mm. thick. Hook. f. 275; Gamble, Man. Ind. Timbers, 2nd. edit. 598; Brandis, Ind. Trees, 561; Robinson in Philip. Journ. Sc. C. Bot. III, 190, Jabl. in Pflanzenreich, l.c. 37. *Nanopetalum myrianthum* Hassk. in Verh. Kon. Ac. Amster. XXIV, 140; Mull. Arg. 510.

SINGAPORE: Jurong, *R.* 3415!; Bukit Mandai, *R.* 3416!; Chu Chu Kang, *R.* 5986!; Kranji, *R.* 6515!.

DISTRIB.—Assam, Lower Burma, Andamans and Nicobars, Malayan Archipelago, Philippines.

25. *CLEISTANTHUS PSEUDOMYRIANTHUS*, Jabl. in Pflanzenreich, IV, 147; VIII, 41; (95). A small tree. *Branchlets* subterete, cinereous, glabrous, 1.5–4 mm. thick. *Laminae* coriaceous, oblong ovate or broadly elliptic, 8–4 cm. long, 3.5–6 cm. broad, with shortly caudately acuminate apex and subacute to rounded base; upper surface pale olivaceous, nitid, glabrous with slender midrib and nerves; lower surface dull, subargenteous, very minutely adpressedly pubescent, with larger but still very small ramentiform brownish hairs scattered + – over the surface especially near the prominent midrib and nerves or glabrescent; nerves 8–10; cross nervules subparallel to rather irregular; petiole subterete, 4 mm. long, transversely closely wrinkled, adpressedly fulvous tomentose at first, later glabrous; stipules lanceolate, 3 mm. long, entire sparsely adpressedly fulvous pubescent. *Flower-clusters* axillary rather few flowered, apparently ♂ and ♀ flowers in the same cluster, but ♂ flowers seen only in extremely minute bud; bracteoles broadly ovate or triangular, + – dorsally carinate, glabrous or minutely adpressedly sparsely pubescent on outer surface. ♀ flowers sessile; calyx 4 mm. long, split more than halfway down into 4–5 coriaceous ovate acute sepals, glabrous; petals spatulate, 2 mm. long, glabrous, with + – erosulate, obtuse or acute apex; disk annular membranous, erect, entire or almost so, glabrous, closely embracing basal half of the ovoid glabrous ovary; styles short, simple or very shortly bifid at apex. *Fruit* on a stout, 5 mm. long, glabrous, obconical pedicel; capsule seen only in pieces, apparently 1 cm. from

base to apex, glabrous, with exocarp + - reticulate on both surfaces. *Seed* broadly scarabaeoid, 5—6 mm. long and broad.

PERAK : Sungei Larut, *W.* 2486 !, the type in Kew Herbarium.

26. *CLEISTANTHUS ELLIPTICUS*, Hook. f. 281. A shrub or tree ; 10—14 m. high, with spreading branches. *Branchlets* 2—5 mm. thick pale-brown, glabrous or pubescent above ; young twigs 2—3 mm. thick, + - rusty-pubescent ; internodes 5—5 cm. long. *Laminæ* coriaceous, elliptic-obovate or ovate, 6—24 cm. long, 3—10 cm. broad, with subacute or shortly caudately acuminate apex and cuneate base ; upper surface dark green when fresh, olivaceous when dry, glabrous or rusty-pubescent on midrib, subnitid, obscurely reticulate ; lower surface dull brown, sparsely very minutely adpressedly rusty-scaly pubescent or glabrescent ; midrib and nerves evident on upper and prominent on lower surface ; nerves 8 ; petiole 5—1 cm. long, rufous-tomentose to glabrescent ; stipules not seen. *Flower-clusters* 1 cm. in diam., densely fulvous-tomentose, of ♂ or ♀ flowers only ; bracteoles broadly ovate, densely rufous-tomentose on outer, glabrous on inner surface. ♂ *flowers* in bud ovoid, 3 mm. long ; calyx rufous-tomentose externally towards the apex, glabrous internally ; sepals deltoid-lanceolate ; petals flabelliform, crenulate, less than 1 mm. long and broad, glabrous ; disk lining the calyx cup, entire ; pistillode short, stout, columnar, trifold, densely hirsute. ♀ *flowers* with calyx of the ♂ ; petals obovate-spathulate, entire, 1 mm. long ; annulus of the disk, membranous ; ovary not seen. *Capsule* on a stout, glabrous, terete, 1 mm. long pedicel, subglobose, glabrous 1.1 cm. in both diameters. *Seeds* elongately ovoid, 8 mm. long, 5 mm. broad, 4 mm. thick, with convex subcarinate dorsal and ill-defined ventro-lateral surfaces, rounded apex and cordately excavate base. *Jabl.* in *Pflanzenreich*, l.c. 32.

PENANG : Batu Ferengy, *C.* 3657 !. PERAK : Larut, *K.C.* 2018 ! 2080 !, 2769 !, 3739 !, 3755 !, 5162 ! ; Assam Kumbong, *W.* 1930 ! Kota, *W.* 2547 ! ; Trong, *W.* 2763 ! ; Thaipeng, *Burn Murdoch* 1731.

The type sheet is *K.C.* 3739 in Kew Herbarium.

27. *CLEISTANTHUS RUFUS* (Hook. f.), Gehrm. Bot. Jahr. buch. XLI, Beibl. No. 95, 42 (1908). A sparingly branched shrub, 3—4 m. high. *Branchlets* terete, 2—5 mm. thick, pale yellowish brown, glabrous below, scurfy rusty pubescent higher up ; internodes 5—3.5 cm. long. *Laminæ* membranous or thinly coriaceous

ovate or obovate, 10—17 cm. long, 4—6·5 cm. broad, with abruptly shortly acuminate apex and rounded to subcuneate base; upper surface at first fulvous tomentose, later glabrous or pubescent only on the slender midrib and nerves, dark olivaceous, finely obscurely reticulate; lower surface dull brown, + — rufous pubescent especially on the prominent nerves and midrib; nerves 8—9; cross nervules numerous, close, subparallel, connected by smaller, less regular secondary nervules; reticulation fine; petiole stout, subterete, + — rusty tomentose, 4—5 mm. long; stipules minute, caducous. *Flower-clusters* axillary, densely rufous tomentose, 4—5 mm. in diam., of many minute flowers, ♂ and ♀ mixed, and almost entirely concealed by the bracteoles, that are broadly ovate, densely scurfy rufous tomentose on outer surface and glabrous on inner. ♀ *flowers* sessile, ovoid, 2·5 mm. long; calyx glabrous except for caducous scurfy rusty tomentose tufts on outer surface of apex, divided about halfway down into ovate or deltoid lobes; petals subquadrate, glabrous, ·5 mm. long and broad, with subcrenulate apical margin; disk subentire; pistillode subtrigonal, sparsely caducously scurfy pubescent, with trifid apex. ♀ *flowers* sessile, ovoid or fusiform in bud, 2—3 mm. long; calyx as in the ♂; petals oblong spatulate, glabrous, ·5 mm. long, with subcrenulate apical margin; annulus of the disk membranous, irregularly dentate; ovary globosely ovoid, caducously densely hirsute, the entire hairy coat being readily removed, leaving the ovary glabrous; styles united for some distance, slender, short, subterete, glabrous, shortly bifid; stigmas slightly thickened. *Capsule* on a 4 mm. long, terete, glabrous pedicel, 8 mm. in vertical and 1 cm. in transverse diam., glabrous, subnitid, reticulate. *Seeds* not seen mature. Jabl. in Pflanzenreich, l.c. 32. *Bridelia rufo*, Hook. f. 273.

PENANG: 30—120 m. K.C. 1351!; Waterfall, C. 1480!

### 3. ACTEPHILA, Bl.

Shrubs or trees, with simple, alternate, petiolate, stipulate, entire, penninerved leaves; lateral nerves of the laminae curved slightly outwards and forwards to inarch near the margin; nervules irregular; reticulation irregularly polygonal, fairly close. *Flowers* monoecious, petaliferous, axillary, in closely imbricatingly bracteolate nodules or very small racemules, pedicelled, ♂ and ♀ in the same axil or in different axils; calyx of both sexes 5-fid almost to the base, the sepals entire imbricate in bud persistent in the ♀;

petals 5 in both sexes, much smaller than the sepals and attached just external to the disc; stamens 5, within the disc, surrounding a central trifid pistillode, filaments free or united only at the base anthers adnate, loculi parallel; disc in both sexes a shallow cup or ring, thinly fleshy, with  $\pm$  crenulate margin, glabrous; ovary sessile on the disc, subglobose, 3-locular, the loculi 2-ovuled, glabrous or tomentose; styles 3, minute, free or united at the base, thick, entire or bifid, persistent. *Fruit* a dry 3-coccate capsule, loculicidal or the cocci breaking into 2 valves, leaving a central columella. Cocci 1—2-seeded. *Seeds* triquetrous, rather large, with convex dorsum and 2 plane lateral surfaces meeting at an acute angle; testa thin; albumen scanty or 0; cotyledons fleshy, conduplicate. Species about 10, distributed from Southern and Eastern India to the Malayan Archipelago and Australia.

♀ sepals 1—2 cm. long; ovary tomentose .. .. 1. *A. ovalis*.

♀ sepals only a few mms. long; ovary glabrous.

Lamina relatively small, rarely longer than 17 cm. or

broader than 4.5 cm. .. .. 2. *A. excelsa*.

Lamina relatively large, up to 30 cm. long and 9.5 cm.

broad .. .. 3. *A. javanica*.

1. *ACTEPHILA OVALIS* (Ridley), Gage in Rec. Bot. Surv. Ind., IX, No. 2 (1922), 219. A ? shrub or ? tree. *Branchlets* at first angled and grooved, later subterete, 2—4 mm. thick,  $\pm$  minutely puberulous, brown; internodes a few mms. to 5 cm. long. *Laminæ* elongate ovate or obovate or lanceolate, membranous, 6—15 cm. long, 2—6 cm. broad, with obtuse apex in obovate laminæ acuminate in others, base cuneate or subcuneate, glabrous on both surfaces, subnitid and pale green to olivaceous on the upper, dull and paler on the lower; midrib slender on both surfaces; nerves 12—16; reticulation delicate; petiole slender, 2—4 mm. long, glabrous or with a few minute hairs; stipules membranous, broadly lanceolate, 2—2.5 mm. long, glabrous or with a few minute hairs on outer surface. *Male* inflorescence not seen. *Female* inflorescence of solitary flowers in the axils; pedicels 4—6 cm. long, slender, slightly thickening towards the calyx, glabrous or with a few minute hairs near the calyx; calyx spreading, 2.5—4.4 cm. across; sepals slightly unequal, membranous or subscarious, broadly ovate, acute, 1—2 cm. long, 6—1.5 cm. broad, sparsely puberulous and obscurely glandular or eglandular at the base, with midrib and 3—4 nerves radiating from the base on each side of the midrib, and with clear dendritic reticulation; petals minute, membranous, distant, ovate or obovate



1 mm. long, with obtuse entire or erosulate apex; disc annular 1 mm. broad, shallowly subcrenulate; ovary obtusely trigonously ovoid, 2 mm. in diam., densely fulvous tomentose, externally, glabrous internally; styles united at the base, entire, spreading, 2.5 mm. long, fleshly subulate, with subcapitate, slightly recurved stigmatic apex. *Capsule* about 1.5 cm. from base to apex; cocci minutely sparsely adpressedly pubescent, breaking into 2 valves; epicarp and mesocarp coriaceous, with inner surface of mesocarp reticulately rugulose; endocarp crustaceous, finely rugulose on inner surface. *Seeds* subcordately ovoid, 1 cm. long and broad, 6 mm. thick, with crustaceous smooth obscurely mottled testa. *Dimorphocalyx ovalis* Ridley in Journ. Straits Br. Roy. Asiat. Soc. No. 50, 178 (1911).

PERLIS: Kanya, R. 14890! LANGKAWI: Coah, C.!

This remarkable species has a deceptive resemblance to a *Dimorphocalyx* but the 2-ovuled loculi and the absence of albumen, with the presence of the outperlicated cotyledons declare it an *Actephila*.

2. *ACTEPHILA EXCELSA*, Mull. Arg. in Linnaea XXXII, 73 (1863).

A shrub. *Branchlets* 1.5—3 mm. thick, pale brown, glabrous or  $\pm$  minutely hirtellous; internodes .5—3 cm. long. *Laminae* elliptical lanceolate, thinly coriaceous, 6—17 cm. long, 1.8—4.5 cm. broad, with acute or acuminate apex and cuneate or subcuneate base, glabrous on both surfaces, subnitid on upper, dull on lower; nerves and midrib slender; nerves 10—12; reticulation fairly clear petiole 3—4 mm. long, stoutish, glabrous or sparsely hirtellous; stipules deciduous, scarious, lanceolate, 2—3 mm. long, entire, glabrous or with a few minute hairs on outer surface. *Male flowers* usually several in an axil, females several or solitary; bracteoles broadly ovate, entire, 1—2 mm. long and broad, membranous,  $\pm$  concave, with a few minute hairs on the outer, glabrous on the inner surface; male flower pedicels slender, subterete, 5—6 mm. long, thickening towards the calyx,  $\pm$  sparsely hirtellous; male calyx subcampanulate, 3 mm. long, sepals somewhat unequal, oblong ovate or broadly lanceolate,  $\pm$  sparsely minutely adpressedly hairy on outer glabrous on inner surface; petals narrowly spatulate, glabrous, entire, 1—1.5 mm. long; disc annular, crenulate; stamens free; pistillode columnar. *Pedicel* of female flowers slender, up to 5 cm. long thickening gradually to the calyx, glabrous or with a few minute adpressed hairs; perianth and disc as in the male but somewhat

larger; ovary subglobose, glabrous; styles minute, very short, stout, glabrous, bifid, with subcapitate stigmatic apices. *Capsule* depressed slightly, 1.5—2 cm. in transverse and 1—1.3 cm. in vertical diameter, glabrous, slightly rough, obscurely veined, the cocci breaking into 2 valves; pericarp crustaceous, scarcely 1 mm. thick; endocarp glabrous, nitid and finely rugulose within. *Seeds* triquetrous, 1 cm. long, with a very convex dorsum, and 2 plane lateral surfaces meeting at an acute angle. Mull. Arg., 222. Hook f., 282.

PERAK: Larut, K.C. 7166!; Tambin, R. 9592!

SELANGOR: Kwala Lumpur, C. 2379!; Gua Batu, R. 8530!

SINGAPORE: Sungei Morai, R. 1.

### 3. *ACTEPHILA JAVANICA*; Miq. Fl. Ind. Bat. 1, 2, 356 (1859).

A small tree. *Branchlets* subterete 2—5 mm. thick, at first minutely sparsely hirtellous, then glabrous; internodes 1—4 cm. long. *Laminae* thinly coriaceous, oblong elliptical, lanceolate or oblanceolate, 6.5—30 cm. long, 2.2—9.5 cm. broad, glabrous, with shortly caudately acuminate apex and subcuneate base, subnitid on upper, dull on lower surface, with slender nerves and midrib; nerves 7—12; reticulation clear; petiole somewhat slender, slightly thickened at both ends, grooved on upper surface, .8—5 cm. long, glabrous or sparsely hirtellous; stipules triangular, entire, acute 3—4 mm. long,  $\pm$  puberulous on outer, glabrous on inner surface. *Flowers* in closely imbricatingly bracteolate nodules or very short racemules,  $\sigma$  and  $\varphi$  in the same or different axils; bracteoles triangular, 1 mm. long and broad, entire, glabrous,  $\pm$  concave,  $\sigma$  flower pedicels 3—5 mm. long, terete, glabrous or sparsely minutely hirtellous; calyx subglobose in bud, 2 mm. in diam.; sepals oblong, subequal, glabrous, 2—4 mm. long; petals membranous broadly spatulate, with a very short claw and rounded  $\pm$  erosulate apex; disc subangular, crenulate; pistillode cylindrical, deeply 3-fid, with apices subpeltate and  $\pm$  ciliolate.  $\varphi$  flowers larger than the  $\sigma$ ; pedicels slender, up to 4 cm. long, thickening towards the calyx; perianth as in the  $\sigma$  but sepals larger and bearing on inner surface at the base a transverse series of minute pellucid glands, disc crenulately 5-lobed; ovary trigonously globose, somewhat depressed, glabrous; styles connate at the base, very short, thick 2 fid, the branches with capitate stigmatic apex. *Capsule*  $\pm$

depressed, subglobose, 1.5 cm. high, 2.3 cm. broad, breaking into 3 bivalved 1—2-seeded cocci. *Seed* 1.25 cm. long, with obscurely striate and mottled testa. Mull. Arg., 222; Hook. f., 283; J. J. Smith, 46.

PENANG: West Hill, C.!. SELANGOR: Batu Caves, R. 13,375! SINGAPORE: *Anderson* 170!; Garden Jungle, R. 402!, 403!.

In addition to these species *K.C.* No. 5073 collected in Larut Perak seems a new species of *Actephila*, but the material is too imperfect for description.

#### 4. ANDRACHNE, Linn.

Shrubs or suffruticose herbs with erect or decumbent branches, glabrous or sparsely hairy. *Leaves* alternate, simple, petiolate, stipulate, entire, penninerved or  $\pm$  distinctly 3-nerved. *Flowers* monoecious, axillary, pedicelled, the  $\sigma$  often fasciculate, the  $\rho$  solitary; calyx of both sexes divided into 5—6 sepals imbricate in bud; petals as many as sepals, smaller, in  $\rho$  flowers minute; disk usually of membranous glands, entire or bilobed, free or variously connate. *Stamens* 5—6, alternate with the petals; anthers erect subglobose, with parallel loculi; pistillode central, minute; cylindrical, entire or 3-partite. *Ovary* subglobose, substipitate, trilocular; styles 3, connate below, bifid above; stigmas subcapitate. *Fruit* a capsule of 3 bivalved 2-seeded cocci; seeds curved, exarillate, ecarunculate, albuminous; cotyledons broad, flat.

Species about 20, variously distributed in Europe, Asia, Africa and N. America.

ANDRACHNE FRUTICOSA, Dene. (non Linn.) in Nouv. Ann. Mus. III, 484 (1834).

A small erect branched shrub, 3—6 m. high. *Stem* terete, 2 mm. thick, pale brown, sparsely shortly hirsute or glabrescent, sparingly alternately branched; branches like the stem but more slender; internodes .5—2.5 cm. long. *Laminæ* ovate or obovate, membranous, 3—9 cm. long, 1.5—4 cm. broad, with acute apex, cuncate base and entire margin; upper surface pale green, with slender midrib and nerves, sparsely adpressedly hirsute at first, then glabrous or sparsely hirsute on midrib; lower surface paler green, subglaucous, with slightly prominent midrib and nerves, sparsely adpressedly hirsute; nerves 3—4, subopposite or alternate, curved forward and outward to inarch with each other near the margin; reticulation delicate, irregularly polygonal; petiole slender, subterete, + - hirsute, .5—2 cm. long; stipules.....  $\sigma$  flowers

minute, on filiform, hirsute or glabrous, .5—1 cm. long pedicels, calyx cupular, 1 mm. long and broad, divided almost to base into 5 oblong ovate or obovate sepals, sparsely hirsute on outer surface glabrous on inner; petals much narrower than sepals, spatulate hyaline, .5 mm. long, glabrous; disk of as many pairs of glands as sepals and opposite the latter; the glands linear, submembranous, glabrous, half as long as the sepals; stamens free, with very filiform glabrous filaments half as long as the sepals; anthers minute, subquadrately ovate; pistillode central, of several, minute, subterete lobes. ♀ flowers larger than the ♂, on slender hirsute pedicels that may reach 1 cm. in length; calyx 4 mm. long, otherwise as in the ♂; petals 0 or very minute; disk glands opposite the sepals, short, obovate, bluntly bilobulate; ovary globosely ovoid, hirsute, 1.5 mm. in vertical, 2 mm. in transverse diam., styles glabrous, less than 1 mm. long, bifid almost to the base; stigmas clavellate. Capsule subglobose, depressed, hirsute, 4 mm. in diameter. Seeds triquetrous, 1.5 mm. long, 1 mm. thick, with longitudinally curved dorsal and 2 plane lateral surfaces, all transversely plurisulcate, glabrous and dark brown. Mull. Arg., 235; Hook f., 284 and Ic. Plant. XVIII t. 1704. *A. Decaisnei* Bth. Fl Austral. VI, 88.

PERLIS: Tebeng Tinggi, R. 14883!. KEDAH: Langkawi, C 2540!.

PERAK: Larut, K.C. 2383!; Gunong Pondo, K.C. 8336!. SELANGOR: Kwala Lumpa, Kelsall!; Gua Batu, R. 8203!.

DISTRIB.—Siam, Malayan Archipelago, Philippines, Australia.

*Andrachne fruticosa* was the name originally given by Linnaeus to the species now known as *Breynia patens* Bth. Decaisne in 1834 published the description of a species from Timor under the name "*Andrachne fruticosa* L." assuming incorrectly that it was the plant of Linnaeus. As the plant of Linnaeus was not an *Andrachne* while Decaisne's plant was, J. Muller in DC Prodr. XV, II, 235 (1886) retained Decaisne's name and applied it to Decaisne's plant. The Malayan Peninsula specimens agree with Decaisne's plant. Hooker f in Ic. Plant. xviii, t. 1704 does not agree with Müller, who placed Cumming's Philippine specimens under *A. australis*. Hooker considers part if not all of *A. australis* Mull. Arg. as *A. fruticosa* Dene. Hooker also rejects, which I think good reason, Bentham's name of *A. Decaisnei* in the Flora of Australia.

## 5. AGYNEIA L.

Annual or perennial ascending or procumbent herbs with diffuse angled or compressed stems and alternate stipulate leaves Inflorescence of monoecious apetalous flowers in axillary fascicles



usually one ♀ and several ♂ flowers in an axil. *Flowers* small shortly pedicelled; calyx of both sexes 6-partite or the ♀ calyx 5-partite and persistent; sepals imbricate in bud. *Disc* of ♂ flowers extra-staminal, of 5—6 somewhat elongate subpetaloid lobes opposite the sepals; stamens forming a central column with an enlarged trigonous apex; anthers sessile, attached to the angles of apex of column, with parallel loculi, extrorse, dehiscing longitudinally; pistillode absent. ♀ flowers without a disc; ovary when young turbinate, with a thick rather fleshy apex; styles 3, short, bifid, with incurved stigmas; loculi 3, each 2-ovuled; later the apex of ovary becomes excavate with a 6-lobulate margin and the styles sunk in the cavity. *Fruit* an ovoid dry dehiscent capsule on the persistent calyx; cocci 3, bivalved, 2-seeded, breaking away from a central columella. *Seeds* narrowly triquetrous, curved along their length; albumen fleshy; cotyledons plane.

DISTRIB. 2 species, distributed to India, Malaya and Mauritius.

AGYNEIA BACCIFORMIS, Ad. Juss. Tent. Euph., 24 (1824).

An annual or perennial glabrous herb, up to 40 cm high. *Root* ± vertical, subterete, tortuous, woody, 2 mm. thick. *Stems* alternately or dichotomously branched, slender, subterete or subangular internodes 5—5 cm. long. *Laminæ* ovate to linear-lanceolate membranous, 1—3 cm. long, 2—1.2 cm. broad, with acute apex, subacute cuneate or obtuse base and entire margin; nerves 5, slender, obscure, inarching near the margin; reticulation obscurely polygonal; petiole 1 mm. long; somewhat flattened; stipules 1 mm. long, aculeolate. ♂ *flowers* very minute; sepals oblong ovate truncate, subtrilobed with inflected apex. ♀ *flowers* very shortly pedicelled; calyx 2 mm. deep; sepals 5—6, subequal, ovate, acute gland dotted and margined with white. *Capsule* subglobose ovoid, obtusely trigonous, 5 mm. high, 4 mm. thick, reddish-brown; cocci slightly carinate. *Seeds* light brown, with tetragonous tuberculate base, acute trigonous apex, and ventral angle truncate for some distance, and with a longitudinal hilar excavation. Mull. Arg. 238; Hook. f. 285.

PAHANG: Kwala Pahang, R. 1. SINGAPORE: Tanjong Katong, R. 1. DISTRIB. India, Ceylon, Java, Mauritius.

#### 6. FLUGGEA, Willd.

Unarmed or spinescent shrubs, with small alternate entire petioled penninerved leaves. *Flowers* dioecious, small, in basally

minutely multi-bracteolate axillary fascicles, apetalous, males often numerous, females usually few in a fascicle. *Calyx* of both sexes similar, deeply 5-partite, with sepals imbricate in bud. *Stamens* 5 or sometimes fewer, free; anthers erect, extrorse, with parallel loculi and longitudinal dehiscence; disc in the ♂ of minute glands alternating with the stamens; pistillode 2—3-partite. *Ovary* 3-locular, seated on an annular disc, the loculi 2-ovuled; styles 3, basally connate, recurved or spreading, 2-partite, the branches entire or bifid. *Fruit* baccate or breaking into 2-valved cocci. *Seeds* triquetrous; albumen rather scanty; embryo incurved, with broad flat cotyledons. **DISTRIB.** About 6 species in Tropical Africa and Asia.

*FLUEGGEA VIROSA*, Baill. Et. Euphorb. 593, t. xxvi, f. 39 (1858).

*Branchlets* divaricate glabrous, .5—2 mm. thick, quadrangular, ribbed, brown, ± lenticellate; internodes .5—2 cm. long. *Laminae* ovate, oblong ovate or obovate, membranous, 1.5—4 cm. long, .8—2.2 cm. broad, with rounded to subacute apex, entire margin and acute base, glabrous and dull on both surfaces, glaucescent on the lower; midrib nerves and nervules slender; nerves 6—9, curved outwards and forwards to inarch near the margin: nervules irregular; reticulation irregularly polygonal, close; petiole slender, glabrous, subterete, 3—6 mm. long; stipules triangular, acute, glabrous, 2—2.5 mm. long. *Bracteoles* of fascicles ovate or triangular, membranous, glabrous, .5—1 mm. long. ♂ *flowers* on terete, glabrous, 2—4 mm. long pedicels; calyx obovoid in bud; sepals subequal, oblong ovate or obovate, .7—1 mm. long, membranous, glabrous, with minutely erosulate apical margin; glands fleshy, ± angled; pistillode conspicuous, glabrous, deeply 3-fid, the branches with recurved dilated and ± divaricately bifid apex. ♀ *flowers* on glabrous terete .7—3 mm. long pedicels; calyx 4—5-partite, the sepals unequal, ovate 1—2 mm. long, entire or ± erosulate; disc thinly fleshy, crenulate; ovary pyriform, glabrous; styles loricata, deeply bifid. *Fruiting* pedicel filiform, 2.5—3.5 cm. long; fruit indehiscent, depressed globose, white, 5—8 mm. in diam., with fleshy mesocarp. *Seeds* 1.7—2.4 mm. long. Hook. f. 328; J. J. Smith 51; Fl. Trop. Africa, VI, Sect. I. Pt. IV, 736.

**KEDAH:** *K.C.* 700!; Sungei Ryah, *K.C.* 99!. **DISTRIB.** Tropical Africa, Asia and Australia.

## 7. PHYLLANTHUS, L.

Herbs, shrubs or trees. *Leaves* varying much in size and shape alternate, reduced to minute scales on the primary branches, distichous on the branchlets, with entire laminae, penninerved, equilateral or inequilateral, shortly petioled, stipulate. *Flowers* usually monoecious, apetalous, discigerous, small, axillary, solitary or glomerate or in minute glomeriform racemules. ♂ *calyx* 4—6-partite, the sepals imbricate in 2 series,  $\pm$  ovate, entire or  $\pm$  fimbriate, disc rarely a narrow membranous lobed ring, usually of 4—6 minute, subreniform or amorphous scalelike glands alternate with the sepals, androecium of 2—5 stamens, the smaller number usually united in a short central column, the larger number free and  $\pm$  diverging or the inner 2—3  $\pm$  connate by their filaments; anthers minute, ovate, sessile on the column and didymous or subhorizontal or basifixed and diverging with free filaments or connivent with connate filaments; connectives not or slightly or rarely moderately produced; pistillode 0. ♀ *calyx* with 5—7 sepals, often larger than the male but otherwise resembling it; disc of minute fleshy scales or a membranous crenulate or lobed ring or shallow cup; ovary subglobose ovoid or turbinate, glabrous or  $\pm$  puberulous, 3-locular or (in two Malayan Peninsula species) 4—9-locular; ovules 2 in each loculus, collateral in the 3-locular ovaries, partially superposed in the 4—9-locular ovaries; styles as many as the loculi, simple in the 4—9-locular ovaries, bifid in the 3-locular ovaries, free or  $\pm$  connate. *Fruit* a small berry (in two species) or usually a subglobose dry septifragally dehiscent 3-locular capsule, glabrous or  $\pm$  puberulous or echinate, small or moderately sized or rather large and inflated. *Seeds* triquetrous, varying much in size, with a convex dorsal and 2 ventro-lateral plane surfaces, granulate or minutely tubercled or striate or pitted or transversely or longitudinally ridged; testa crustaceous; albumen fleshy; cotyledons flat or flexuous.—DISTRIB. About 400 species, throughout the tropics and subtropics.

Even with *Glochidion* separated off, *Phyllanthus* still remains a somewhat mixed genus, and a re-elevation of some of its sections to generic rank would probably be an advantage. The scope of this account of the Malayan Peninsula species does not justify me in intrenching on the work of the monographer, and so here the genus as treated in the Flora of British India has as regards its sections been left undisturbed.

Hooker's statement (Fl. Brit. Ind. V, 286) that the ♂ flowers in the *Emblica* section have no disc requires qualification, as his own species *P. pectinatus* has

distinct glands in the ♂ flowers. Ridley (Trans. Linn. Soc. 2nd Ser. III, Bot. 345) records *P. maderaspatensis* L. from the sea shore at Kwala Pahang. I have however seen no specimen of that species in the herbaria of Kew, Singapore, Penang, and Calcutta from the Malayan Peninsula. *P. Emblica* L. is stated in the Flora of British India to be distributed as far south as Malacca, but I have seen no specimens in the herbaria mentioned above. *P. acutus* Wall. Cat. 7931, Herb. Finlayson (Fl. Brit. Ind. V, 301), does not appear to occur in the Malayan Peninsula. Finlayson's collections were made in Siam and Cochin-China and were taken to Calcutta by Wallich when the latter returned from his visit to Penang in 1823.

---